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no. 2

Engineering Library

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The AMERICAN ENGINEER

FEBRUARY - - - 1934

Inside this Cabinet are 27 Copper Chimneys

. . . and thereby hangs our tale of . . .

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This radiator is 27″ long; 23″ high and 7″ wide. Weighing only 42 lbs., it is easily portable.
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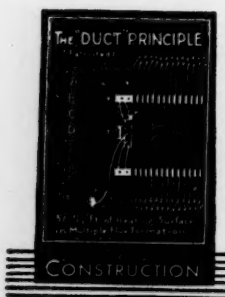

LEFT: Sketch reveals construction of patented DUCT chassis. When switch (D) is turned to "High" or "Low," copper plates (A) are heated by electric elements (B). The air in "ducts" (C) is heated and rises rapidly.

DUCT
THE economical
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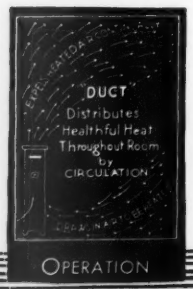
RIGHT: Thorough and rapid heating causes strong circulatory effect. Heated air is uniformly distributed throughout the room without the aid of fans or blowers. Only Duct offers this patented principle and its significant results.



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CONTENTS

Page

When a Code? 3

Engineers and Unity 4

The Lives of the Engineers 5
By J. W. ROE

Civilian Conservation Corps 6

Engineers and Civilization 7

Recovery Activities 8
By GERALD W. WRIGHT

Whither Engineering? 9
By A. A. POTTER

General News and Comments 10
- Looking Around and Looking Ahead
- Sports of the Times
- The Trisection of an Angle

New York and New Jersey News and Activities 11
- Meeting of the Executive Board
- History of Supervision of Relief Projects
- Chapter News

Directory of Engineers 24

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WHEN A CODE?

Latest Proposals Present New Problems

Engineers Fail to Satisfy N. R. A.

WHETHER Engineers should or should not be coded, again looms as an important question. The coding committee has satisfied neither Engineers nor N. R. A. officials. In the eyes of those who administer, the Engineer has already proven unequal to the task of regulating his profession. He has failed to comprehend the underlying purposes of coding, and as a result stands unhappily adjudged before the bar of public and official opinion. Unable to regulate himself, can he reasonably be expected to regulate for others? The present situation has been well summed up by Mr. Frederick Ward, Director of the New York State Society and Past President of the Kings County Chapter. Mr. Ward, who recently represented the Society in Washington and who has given much consideration to the question of coding Engineers, in fact, prepared what was probably the first code proposal drafted, reports as follows:

"1. The whole code question is very much up in the air.

"2. The latest printed edition is Jan. 30th, which has been suggested changed as of Feb. 7th to one-half its size. This Feb. 7th edition is still in the corresponding stage and is not yet an edition for publication. Therefore, the Jan. 30th edition is the base for consideration and nothing new is likely for ten days.

"3. The Jan. 30th edition boils the code down to defining engineering services and allows the code to cover Consulting Engineers and special process men only; or in other words only those who work for a profit are ruled into this industrial code.

"4. It does not truly represent the mass of the profession, whom I would term Creators; the Supervisors and the Final Arbitors of the Construction Industry.

"5. It is known as the Engineering Division of the Construction Industry, as defined by Chapter I of that Code, which appears in the Engineering-News Record of Feb. 9, 1934.

"6. All Federal, State, County and Municipal Engineers are excluded from the Code.

"7. All employed Engineers are excluded.

"8. This leaves (apparently) the mass of our profession but one position, that of collective bargaining. I am as yet uncertain that we have even this right, for I am afraid it is allowed only to common and to skilled labor.

"9. The reason we are in this position is clearly due to the rulings of the Administrators and their desire to prevent labor representatives from being members of the Construction Code Authority and having them fix wages and hours of all classes of skilled labor.

"We are, therefore, not common labor; neither are we permitted to give a minimum wage if we call ourselves skilled labor. We are just nothing as yet, and this Code gives us no teeth to make ourselves something.

"The only advantage of the Engineering Division of the Construction Industry to our profession is that of a "toe-hold" to hang on, for the purpose of amendments and collective bargaining, and to define Engineering Services with a representative on the Construction Code Authority.

"I recommend that we continue to remain in touch with the situation.

"I further recommend that we immediately lay out a plan to have ourselves designated as the official representatives of the licensed Professional Engineers of this State. This should be done by ballot of our 10,000 licensed Engineers. We must also get these men classified, as the exemptions are so many, and we must know whom we are representing. It may be possible to request that New York State be made a region.

"I further recommend that if the Code fails to define Engineering Services, or the nature of the occupation that requires an Engineer, then our profession must withdraw entirely from the Construction Industry Code.

"I believe we are in an impregnable position in this State with the License Law for our enforcing teeth, and also with the possibility of combining nationally with the other licensed states in a National Society of Professional Engineers.

"I believe we should establish a minimum wage for a Professional Engineer for this State, and the occupation that requires a Professional Engineer,

(Continued on Page 19)

ENGINEERS AND UNITY

Detachment of Engineering Groups

(With Permission of the Professional Engineer)

NOT only has the condition of affairs convinced engineers of the general need of *group activity,* but a feature of the situation—the administration of the National Industrial Recovery Act and particularly the Code of the Construction Industry—has revealed dramatically that *engineers have no comprehensive, professional organization* (as distinguished from the technical) *authorized to treat with the other forces involved in the reorganization of industries on the basis of their interdependence.* Engineers are both employers and employees. A grouping of them for purposes of administration of the N. R. A. either as capital or labor fails. Unlike law and medicine and the other professions they are intimately involved in whatever adjustments are made. Their interests should have consideration. The government in this move *can deal only with groups.* From this condition various types of engineers make different deductions. One class insists that the government encourages the regimentation of all kinds of workers in unions because it makes use of the unions to voice the claims of men who constitute a factor in the system they are trying to set up. They immediately argue that the employed engineers must unionize, or federate and affiliate with unions or in some manner get together for the protection of their economic status. That is, of course, *not* the attitude of men who belong to the established societies, or at least it is characteristic of only a *few* of the members. However, the National Recovery Act in its administration has revealed even in the older societies an identity of interests and a separateness of instrumentalities for defining and protecting those interests.

In a bulletin released on October 5, 1933, a committee which represents A. S. C. E., A. S. M. E., Am. I. Cons. E., A. S. H. & V. E. and A. A. E., told the story of the drafting of the proposed Engineers' Code for incorporation in the complete Code of the Construction Industry, responsibility for which had been given to the Construction League, comprising in its membership both national trade associations and architects and engineers. The Construction League delegated to the American Institute of Architects the task of drafting the Architects' Code and asked the American Society of Civil Engineers to assume like responsibility for the engineers, since 90% of its membership is engaged in the construction industry. This society invited, however, all the National Engineering Societies and Associations whose membership appeared in any degree involved in the construction industry, and as many local and regional Engineering Societies as appeared feasible to appoint representatives to serve in an advisory capacity in the preparation of the code. The accomplishment of the code *is not an object to stimulate a movement for enduring unity in the profession.* It simply demonstrates that *such unity does not now exist.* Naturally the reaction to the Code of other engineering bodies over the country is interestingly varied. Two groups in New York differing almost as widely as possible in form and purposes of organization illustrate this "coagulating" influence of the government's demand for an engineer's code.

Printing in parenthesis the word "Employees" on their letterhead beneath the name "Federation of Architects, Engineers, Chemists and Technicians" this organization declares that "no organization can appear in behalf of the employers and the employees at the same time." It has prepared and submitted a blanket code at the hearings of the construction, chemical, cement and other industries, according to its own statement. It aspires to become a national organization, but limits its membership in the very beginning to a part of the profession.

In the *American Engineer* (August 1933) is an open letter from Dr. D. B. Steinman to the members of the Professional Engineers United Front Committee for the Metropolitan Area of New York which accompanied the preliminary draft of their Code of Fair Competition. Two of the points on which he asked opinion of the committee's membership constitute the quandary which the government's code demand has precipitated. They are quoted.

> 1. Whether, in your opinion, it is *feasible* to enroll the Engineering Profession (or at least that part of it associated in any manner with the Construction Industry) under the provisions of Title 1 of the National Industrial Recovery Act.
>
> 2. Whether, in your opinion, it is *desirable* to so enroll the Engineering Profession.

No central agency exists through which the answer of engineers to these questions can be recorded—unaffiliated engineers as well as members of the very numerous societies and clubs. *No association* reaches them *all* to put the questions to those who are unaware of the imminence of the code or indifferent to the whole matter. It is not necessary to consider whether the reaction is favorable or unfavorable with regard to the profession's participation in the working of the N. R. A. The significant thing is that the *whole situation reveals that no unity exists in the profession.* There is *no* organization of such extensive and representative membership that the profession can be polled on the advisability of any measure *affecting the whole profession*; none which on account of comprehensive makeup can devise instruments which are adapted to the needs of *every type and grade of engineer in relation to all others and to society*; none which has the power of numbers and universality to campaign vigorously and

(Continued on Page 19)

The Lives Of The Engineers

Biography for Reading

By J. W. Roe

(With Permission of Mechanical Engineer)

In Bacon's "Advancement of Learning" is the following, mellow with age but sound as ever: "history is of three kinds, according to the subject it propoundeth . . . for it representeth a time, a person, or an action. The first we call Chronicles, the second Lives, and the third Narratives or Relations. Of these, although the first be the most complete and absolute kind of history, yet the second excelleth it in profit and in use. . . . Histories do rather set forth the pomp of business than the true and inward resorts thereof. Lives if they be well written . . . contain a more true, native, and lively representation."

If one would really *feel* the greatness of the British nation and its contribution to civilization, he should spend an afternoon in the National Portrait Gallery in London. Here are hundreds of portraits, beginning with those of Edward III and Chaucer, kings, nobles, commoners, soldiers, writers, engineers, scientists, rich and poor—all who have made the history of the English people. As one stands in some of the rooms—the Elizabethan, the Georgian, and the much-derided Victorian—and looks about him, the thought comes to him: What a strange unrecognizable thing life would be if these and what they stood for were left out of our civilization.

What portraiture is to painting, biography is to history. As Bacon says, "the Lives," well written, have a vividness and an appeal which scholarly histories lack; and what he says is particularly true of engineering biography.

Some years ago, I heard of an interesting argument. A cub lawyer was maintaining the traditional position that only law, theology, and medicine were professions and that engineering was a mere vocation. An engineer present, finally said he was willing to maintain the thesis, then and there, before the rest of the company, that the engineers had affected human life throughout the world more profoundly in the last 200 years than the lawyers had in the last 2000. After thinking it over, the lawyer declined to take up the challenge.

All historians acknowledge the tremendous influence of the work of the engineers. They discuss their influence on transportation, trade, production, the standards of living, the Industrial Revolution, and the rise of the factory system—sometimes to praise, sometimes to blame. But of the lives of the engineers themselves they say little. This is a pity because in many cases these men were interesting. They were strong characters, indomitable fighters whose lives were full of well-worn accomplishment.

Engineers have not appealed to biographers as have soldiers, statesmen, and writers. Their work is less spectacular, much of it is technical, and the results are often slow in materializing. First-hand information about them has disappeared by the time the world has become interested in what they did. Newcomen is a case. We would give much now to know more about him, but the material seems lost beyond recall. Few literary men have known much about engineers or cared about them, and few engineers have had the capacity to write well about their own work. Nasmyth is almost the only one to have written an autobiography.

One writer, Dr. Samuel Smiles, has done more than any one else to make known the contributions and the characters of the great engineers, particularly those of England, up to the middle of the last century. The way he became interested in them is significant, as he was not an engineer himself. In a series of lectures to workmen in Leeds, England, on self-help, he found that engineers provided the most apt and vivid illustrations of self-development and of great accomplishment in the face of difficulties. This led to his writing the series, "The Lives of the Engineers," the best group of biographies of engineers we have. It covers Vermuyden, the Dutch engineer who brought drainage and reclamation from Holland to England; Myddleton, who first brought water to London; Brindley, the canal builder; Metcalf, the amazing road builder who was stone blind from early boyhood; Telford; McAdam; Smeaton; and Rennie. These are grouped into three volumes. The fourth covers Boulton and Watt. We all know about Watt, but few realize the debt we owe to Matthew Boulton, whose vision, courage, and business skill carried Watt from certain failure to splendid success. The fifth volume deals with George and Robert Stephenson and the earlier inventors of the steam locomotive.

An inventor, if successful, is peculiarly the product of his time and circumstances. The past is strewn with good inventions made before the world was ready for them. Leonardo's sketches are crowded with ideas which are generations ahead of his time. A successful invention is like the seed in the parable, it must not only be good seed, but must fall on good ground ready for it.

If the modern automobile could conceivably have been invented in the middle ages, the invention would, for a long time, have been practically useless. Neither the materials nor the tools existed with which it could be made, nor were there anywhere roads on which it could have run. At times, economic conditions have called on the inventors, in which case success was rapid; at other times the inventors have anticipated the need and the

(Continued on Page 19)

CIVILIAN CONSERVATION CORPS

A Story of Camp No. 5

By Captain Warner E. Strecker

THIS is not a story of the Civilian Conservation Corps as a whole but rather of the 211th Company of that Corps in particular.

The company was originally organized at Fort Wadsworth, N. Y., on April 11, 1933, under the command of Captain Hans C. Jespersen, 18th Infantry, U. S. A. After a period of conditioning, it moved to Davenport, N. Y., and established what was known as Camp Number 6. On November 11, 1933, the company moved to Deposit, N. Y., and occupied its winter quarters, known as Camp Number 51.

The personnel of the company at the present time consists of one Regular Army officer and three Reserve Corps officers, one of whom is the camp doctor; three Regular Army enlisted men and one hundred and forty-nine C. C. C.'s. It is expected that the company will soon be recruited to full strength of two hundred men by local enrollment. Of the C. C. C. members, eight are classed as leaders and fourteen as assistant leaders. Leaders receive forty-five dollars per month, assistant leaders thirty-six and the other men thirty. Of the pay received, a large portion is alloted to the families of the men directly from the Finance Officer of the Army. This allotment varies due to the circumstances of the family but is generally from twenty-two to twenty-five dollars.

In Camp Number 6 at Davenport, the officers and men were housed in army tents but with the approach of colder weather, barracks were constructed and on their completion, the tent camp was abandoned and the barracks occupied. Our present camp has six barracks buildings, 112 feet by 20 feet; a mess hall, 120 feet by 20 feet; an infirmary, 40 feet by 20 feet; a storage building, 56 feet by 20 feet; a recreation building, 72 feet by 20 feet; a bath house, 56 feet by 20 feet; a latrine, 40 feet by 20 feet, and a pump house, 20 feet by 10 feet. A garage, 126 feet by 24 feet with 9 stalls and a shop section has just been completed to house the seven State trucks and 1 pick-up wagon. Another garage for Federal trucks, 72 feet by 24 feet with 6 stalls is under construction. In addition to these buildings, there is a 2000 gallon water tank to supply the water system of the camp. The buildings are all of frame construction lined with ¾-inch wall board and are heated by two wood stoves per building. An additional stove for each building is now being installed.

The messing of the men is a matter of great moment as it has been found that men can put up with almost any hardship provided their stomachs are well filled. The ration allowance per man per day for the month of December was 36.35c and while that amount may seem low, I can assure you that the food is of excellent quality and of sufficient quantity. We buy most of our canned food through the Army Quartermaster and thus take advantage of the low prices he is able to obtain by contracts. Meats, bread and milk are bought locally from concerns who are under contract with the Quartermaster and consequently low prices are also obtained for this class of food. At Thanksgiving, Christmas and New Years, the ration allowance was increased by a fraction over 20c which permitted the serving of turkey with all the fixings on all three holidays.

In the matter of clothing, the men are again very well provided for. They are issued heavy underwear and socks, woolen shirts, leather wind breakers, woolen jerkins, woolen trousers, regulation army overcoats, army shoes, heavy rubber laced boots, mattress, sheets, pillow and pillow cases, four blankets and a cotton comforter. They are responsible for the care of this clothing but a liberal allowance is made for wear and tear.

Our infirmary is not a hospital but the doctor, who is on duty at all times, is well able to take care of all minor illnesses. Men with mildly contagious illnesses such as head colds are isolated in the infirmary until their condition is cleared up. For more serious ailments, the patient is moved at once either to a local hospital or to an army hospital if the condition is serious enough to warrant such a movement.

The men are not under rigid military discipline. They sign up for six months with the privilege of discharge at any time they can obtain work elsewhere so that their discharge creates a vacancy for someone else. Under such conditions they are really civilian employees and cannot be treated as soldiers. The company commander has the power to inflict punishment for misdemeanors and this may take the form of the more unpleasant camp details on week-ends or it may be a money fine as high as three days pay. For the more hardened offenders, our only recourse is a dishonorable discharge.

The State transportation mentioned previously is used to transport the men to and from work and on occasion, it is used to take groups to athletic events, shows in town and similar trips. The Federal transportation in camp consists of three trucks for the hauling of supplies and such tasks and an ambulance. The drivers are selected from the personnel having driving experience and these drivers are held responsible for the care of the transportation.

The working details of the camp are under the direct supervision of a camp superintendent and thirteen foresters of the Forest service of the Federal Department of Agriculture. At the first camp at Davenport, sole attention was given to the protection of some 1300 acres of white pine trees from blister rust. This is a fungus disease which has in the past destroyed many thousands of white

(Continued on Page 20)

ENGINEERS AND CIVILIZATION

The Social Advantages and Disadvantages of the Engineering-Scientific Approach to Civilization

An Address by Henry A. Wallace, Secretary of Agriculture, before the American Association for the Advancement of Science, at Boston, Mass, December 29, 1933, at 8:30 P. M.

I SUPPOSE you are all more or less familiar with that concept of the cyclical rhythm of civilization which has been popularized in recent years by Petrie, the Egyptologist, and Spengler, the German philosopher. According to this analysis, a civilization takes its origin in a profound, but as yet unexpressed new attitude on the part of a virile, agricultural people toward the Universe. This profound, original feeling gives the bias to subsequent events throughout the life of the civilization. First, it manifests itself in great cathedrals and sculpture, next in painting, literature, and music, followed by science, mechanics, and wealth, and finally it manifests itself in dissolution which comes because of a lack of faith in the worthwhileness of the original attitude toward the Universe and because of disgust with the material results which have finally been inspired by that attitude. According to this analysis we have now come to the late fall, the eventide of this civilization, and the coming of the engineer is like the coming of Indian summer in late October just before the cold and dreary days of winter.

Philosophical analysis of this sort, even when backed up by archeological research, can of course be merely suggestive. But after our experience with the World War and the depression of the past four years, we are led to question the American credo, based as it has been on faith in Progress Unlimited, derived from endless mechanical invention, improved methods of mass production, and ever-increasing profits. Without accepting either the implicit pessimism of the Spenglerian Twilight philosophy or the Pollyanna optimism of the old-fashioned American go-getter, I would ask you to examine superficially with me the contributions of science and engineering, the dilemma thereby created, and a possible way out.

For 100 years the productivity of the so-called civilized world has increased at the rate of about 3 percent annually. Correcting for increase in population, the output per capita has increased at the rate of about 1 percent annually. In the United States the rate of increase of material wealth has perhaps been a little faster than this. But everywhere there has been apparent a little slowing down during the World War and especially since 1930. And so we have, on the one hand, those people who proclaim that inevitably the pre-depression trend will be resumed, and those who, on the other hand, say that the time of the quantitative expansion of man's control over nature is now rapidly coming to a close.

Engineering and science, combined with the division of labor, have made it possible for an hour of man-labor on the farm to produce several times as much as it did a hundred years ago. In company with the rest of you I have from time to time marveled over the tremendous contribution of the reaper, the binder, the combine, the truck, the tractor and the gang-plow, but inasmuch as we have now come to days of real soul-searching about all the things which we have hitherto called Progress, I think it is high time for all of us to analyze these various labor-saving devices a little more critically. Do they really save as much as appears on first glance?

True it is that the farmer puts in only a mere fraction of his own labor in producing wheat, as compared with 100 years ago, but what about the labor of the men who made the combines and the plows and the tractors? What of the labor of the men who transport the wheat the thousand miles to market, of the vast distributing and advertising machinery which seem to be necessary if we are to operate on the broad scale apparently required by the modern adaptations of engineering and scientific discoveries? Personally, I am inclined to think there is a real net gain, but it is a gain of a sort which can easily be lost altogether unless certain social adaptations are very rapidly perfected.

The change from the back-breaking cradle of our forefathers to the modern combine ought to mean a tremendous release of human energy on the farm for something besides growing and harvesting a crop. The days when wheat was broadcast by hand, perhaps from a saddle horse, in retrospect seem quite romantic, but to the farmer who had to spend days at seeding-time where he now spends hours, the romance probably wore pretty thin. The grind of the harvest of years ago, the sweat of men in the field and women in the kitchen, was an honorable thing, and even celebrated in song and story; but it didn't leave much time for living. The engineers and the scientists have given us the instruments and the methods whereby we can escape much of the grind; theoretically, there ought to be far more time for living and far more with which to enjoy life. Yet the reverse seems to be poignantly true.

The men who invented our labor-saving machinery, the scientists who developed improved varieties and cultural methods, would have been bitterly disappointed had they seen how our social order was to make a mockery of their handiwork. I have no doubt they felt they were directing their talents to free mankind from the fear of scarcity, from the grind of monotonous, all-absorbing toil, and from the terrors of economic insecurity. Things have not worked out that way.

I do not mean to imply that there have been no

(Continued on Page 21)

RECOVERY ACTIVITIES

A New Philosophy of Government

Some Reflections Thereon

By Gerald W. Knight

So much has been written and so much more is about to be set forth relevant to Public Works Administration and Civil Works Administration that one hesitates to offer a commentary thereon.

A brief reference to some activities in one State, New Jersey for example, will afford an idea of what is transpiring throughout the country. Since the 18th of November more than 130,000 men, half of whom were on bread lines or recipients of financial relief, have been given work.

The Civil Works Administration has spent 7½ millions of dollars out of its total allotment of approximately 12 million dollars, to date. It is carrying forward approximately 3,700 projects, and in doing so has absorbed nearly 4,000 of the unemployed engineers, architects and other classifications of technical men.

The Coast and Geodetic Survey under the Federal responsibility of Professor Philip Kissam, of Princeton University, and under the active direction of Mr. Jacob L. Bauer, former State Highway Engineer, has already put on 200 men. The total allotment of men for the New Jersey survey controls is 440, but Colonel Harry Hopkins, Administrator for the Civil Works, sent through an order, which has had the effect, for the moment, of stopping increase in the personnel of this staff. If the Congress moves as it is expected to in supporting the President's program, this work as well as many others will promptly extend its activities and the scope of its responsibility.

A stream and waterways survey is being conducted, using CWA men and under the direction of the New Jersey State Water Policy Commission. Tax maps, particularly in the rural districts, are being developed; sanitary surveys are under way; utility surveys have been organized, and activities of social betterment which were dropped by municipalities because of lack of funds have been resumed, and in a most heartening manner. While it is true that many of the activities under way under CWA auspices would in normal times be considered as poaching on the preserves of the engineer in private practice, there are few, indeed, of the private practitioners who are selfish enough not to rejoice to see these enterprises move forward.

While it is conceded that the National Recovery Program, particularly the CWA, has done a tremendous job, certain developments, as the program has gotten under way, have given the profession at large reason for alarm, not the least of which is the wage scale under which our expert technicians and professional men are having to work. We have been taking our licking so long and so many of us have plumbed depths of despair that the opportunities presented by the CWA were accepted in general most gratefully without thought of the hereafter. Nevertheless it is of greatest concern to the skilled, educated and highly trained engineer that labor because of its compact organization is able to secure preference and is able to stand squarely across the path of the technical man in his pursuit of adequate compensation. Unless something is done immediately to organize the engineering groups militantly for the purpose of obtaining recognition in the way of adequate compensation, we will take a beating, as a class, which we may never be able to heal. As I view it, we are entering upon a new philosophy of government and one in which the Federal power and its multiplied bureaus will be in effective control for years ahead. We pray for Federal assistance and are getting it, but in getting it we are accepting automatically the interjection of influences, particularly by organized labor, that will keep the engineers in subjection in a manner such as has never been suffered by the profession since the professions were first recognized. The foundation societies are talking about it, but apparently nothing is being done. What has become of the fighting spirit of the engineer?

Under the National Recovery Administration an engineers' code has been adopted, or at least promulgated, governing the conditions under which the various classifications of business are to be conducted. The code of fair practice of the engineers is a ghastly joke. But in all of the codes the distinctive feature is the fewer number of hours per week during which labor may be employed. The specific temporary purpose of this is to create a necessity for the immediate employment of additional labor and minds, and thus to reduce the number of unemployed. But it is also in keeping with the trend that has been consistently for a number of years moving toward an everlessening schedule of work hours. Out of the ruin that was once Technocracy, one definite theme has lived, and that is that there will be shorter work hours and much greater leisure.

From an economic and social standpoint alike, perhaps the most important question outside of a decent living wage, is the anticipated readjustment of labor schedules. How are the additional off duty hours to be spent? If the spare time thus secured, and seen now to be inevitable, is to be spent in unwise indulgence or in indolent idleness, it would have been better, at least for this generation that methods of business recovery should have taken or should take their normal chaotic course.

If the time be spent in wholesome recreation, or for the acquisition of a better education and a

(Continued on Page 23)

THE TULANE UNIVERSITY LIBRARY NEW ORLEANS

WHITHER ENGINEERING?

Annual Meeting—A. S. M. E.

December 5th, 1933

By A. A. Potter

(*Continued from January Issue*)

BEFORE the engineer can take his rightful place in the affairs of the nation and contribute most effectively to social welfare and economic readjustment, we, as a professional body, must take an active and leading part in engineering education, insisting on definite educational standards as a qualification for membership. As engineers we have taken little active part in shaping or in directing engineering education, and our engineering schools have not had the serious backing of the engineering profession. What aid has been given to engineering education by engineers has been largely individual and unofficial, and has not represented the concerted thought or the unified action of the profession. It may be expected that the Engineers' Council for Professional Development, representing as it does the leading engineering societies and with its program definitely focused upon the educational preparation of the engineer, will take a definite stand which will insure that the engineer of tomorrow will be fully prepared to take advantage of the new opportunities and responsibilities which are bound to be his. The Engineers' Council for Professional Development provides an opportunity for The American Society of Mechanical Engineers, and for the other major engineering societies as well, to take a leading part in improving the educational preparation of the engineer. However, it must be realized that reports and recommendations of this Council will not improve the engineering profession without the unified cooperative action of the engineering societies, engineering colleges, and licensing agencies of the various states. The American Society of Mechanical Engineers will, I trust, lead in backing the reports of the Engineers' Council for Professional Development. In the end we may expect that recognition of professional attainment on the basis of education and actual achievement, as tested by examinations, will be substituted for the present haphazard methods of certifying to Society membership. Then we shall find that membership in a society such as ours will unqualifiedly admit to good standing in the great profession of engineering.

At the annual meeting of this Society exactly forty years ago, E. B. Coxe, in his presidential address, decried the tendency of enginering educators to magnify the differences between civil, electrical, mechanical, mining, and other branches of the engineering profession. Unfortunately, this condition still persists, although in practise the work of the engineer is organized largely along the functional lines of research, design, production, operation, and sales, rather than the field indicated by our engineering societies. Undoubtedly there is still a definite need to revise the engineering programs of study so that the young engineer may have a keener interest in the engineering profession as a whole.

Engineering education is now confronted with two radically different requirements. There is, on the one hand, a very definite demand for engineers particularly well prepared in science, mathematics, and technology. At the same time, engineering colleges are urged to give more attention to social sciences. The demand for a more thorough scientific preparation comes from a realization that the major achievements of our profession can only result when the engineer has sufficient preparation to make full use of the foundations laid by pure science, mathematics, and engineering. The pressure brought to bear upon engineering colleges for more social science comes from an appreciation of the fact that the technical graduate lands flat-footed in a world of men with whom he must cope and cooperate, and sadly needs such knowledge as is available regarding the organization of men into society.

In considering the preparation of the engineer, or, in fact, an educational problem, we must keep two things clearly in mind: In the first place, education is an opportunity to gain knowledge, resulting, we like to think, in greater wisdom. But education is not a guarantee of happiness or wealth or position or security or anything else. In the second place, no amount of education or special training will make two people of unequal talent equal. Leaders are not developed from people naturally inclined to follow. The most any educational program can do is to assist the students to attain the highest level which their natural endowment allows. Mentally and temperamentally, men differ far more than in their physical make-ups, and these differences, being inborn, cannot be overcome by education. When by a fortunate combination of natural ability, environment, and industry a technical graduate proves a leader, a driving force in our profession, we are all apt to class as failures all those less fortunately equipped who suffer by comparison, and are inclined to ascribe the inability of some to reach their goal, or the position desired for them by relatives or friends, to the educational system. Straight-thinking people will not make this error, but will remember that not every entering college freshman is even potentially endowed with the leadership of a Napoleon, the technology of a Steinmetz, the scientific prowess of an Einstein, the inventive genius of an Edison, or the wisdom of a Solomon; most people must derive such consolation as may be had from

(Continued on Page 23)

General News And Comments

Informative Items

LOOKING AROUND AND LOOKING AHEAD

By * Vincent J. Scanlan

We have boasted in the past of our splendid resources thinking of these only in terms of possible profits. We have only incidentally approached the tremendous recreational, esthetic treasures of our great Commonwealth. An ocean washes our shores giving us an extended coast line of infinite beauty and attractiveness. From Cape May to Keansburg, some 125 miles, lies an area potentially one of New Jersey's richest assets.

We still possess noble forests containing a wide variety of fauna and practically every kind of tree that can grow in our Northern climate. Sweet water streams are ours and gorgeous water falls, together with every variety of topography from the salt marsh of the coastal plain to the Palisades of the Hudson and the Water Gap of the Delaware.

Criss-crossing the state from Trenton to Jersey City and from the state line near Port Jervis to Atlantic City exists a network of highways unexcelled in quality, magnitude or type by any state in the union or any country on the face of the globe. Overhead roads, express highways, modern to the nth, degree, underpasses, overpasses, and clover leaf intersections representing the last work in the art of highway building. Forerunners of great advances in population and industry and business and trade. Rapidly becoming commonplace but still the backbone of the state are these white ribbons called roads.

In the northerly part of the state lies Newark the industrial center of New Jersey's metropolitan area with its vast and diversified interests and its airport, the busiest in the world. It is the center of an expanding and ever increasing surge of population that presses out like the Mississippi in a flood.

Further north lies the Silk City, Paterson, site of the Great Falls of the Passaic where L' Enfant, "Washington's aide with the flaming imagination," laid out America's first industrial center which was intended to make the new nation free from the need of importing maunfactured goods from Europe. It is the business center of three counties.

On the west bank of the Hudson, where Alexander Hamilton once said would one day rise the world's greatest city, stands Jersey City. The second city of the state with its splendid harbor below, the undeveloped upper section of the Hudson offers an ideal combination of land and water facilities.

Inland are The Hackensack and Newark Meadows, comprising thirty to forty thousand acres in the heart of North Jersey with excellent transpor-

(Continued on Page 17)

SPORTS OF THE TIMES

Military Report, Not Secret or Confidential

By John Kieran

The following item, culled from the New York Times of recent date is both interesting and subtle. It should appeal especially to Engineers who saw service in the late war:

There is no harm in spreading the news to all ranks. The Army football team of 1933 was one of the best in the country, and now the secret can be told.

As even an artillery sergeant may remember, the outlook was dark at the beginning of the Autumn campaign. There was a new coach; just a young chap. Almost all the regulars of the previous year had been lost through graduation. In a football way, the situation was of the kind that led Marshall Haig to issue his famous "our-backs-are-to-the-wall" proclamation in Picardy in the Spring of 1918.

From that gloomy position the Army football team went into action and gained one victory after another. Only in the last trench was it halted and finally driven back for a loss. The Army outfit came within fifteen minutes, within two points, of closing out the campaign without a blot on the 'scutcheon. It was a performance that will go ringing down in military annals.

HANDING OUT THE LAURELS

In military posts all over the country and in certain far off territories the cheers went up: "Rah for the Army!"

But just a moment. That term "the Army" is a little vague. To place the real credit for the success of the West Point troops in the last football campaign, it is necessary to remember that the Army is divided into various branches and corps. There is the cavalry branch, for instance. Nice chaps, but they haven't heard yet that horses went out some time ago. There is the Quartermaster Corps that—but it is best not to go into it. It might cause ill-feeling in the service.

To come to the point: the reason for the success of the Army football campaign of 1933 was that, from the very first move, it was directed and conducted by that branch of the service known as the Corps of Engineers. The infantry is all right in its own way (which it often is) and there are good men in the artillery branch—two at the very least, and possibly more if a searching party looked under the limbers. But the luck of the Army eleven of the last campaign was that it was under the tutelage of a General Staff made up of Engineer officers.

Beginning at the top, there was General Douglas MacArthur, Chief of Staff of the United States Army. He came up through the Corps of Engi-

(Continued on Page 17)

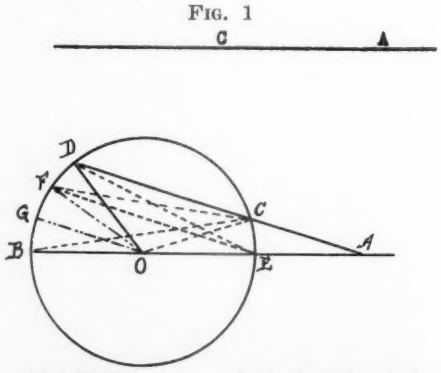
THE TRISECTION OF AN ANGLE

By Walter A. Herckenrath

The trisection of an angle by the sole use of straightedge and compass, has occupied the attention of mathematicians for centuries, although many an ambitious master has succumbed,—baffled by the exaction of rigid adherence to the conditions imposed. In spite of this insistence, however, the problem continues to be repeatedly attacked. The present article is submitted as an item of interest.

In the exemplification which follows, it may be objected that the rule regarding the use of only straightedge and compass has not been rigidly observed. However that may be, the problem is presented for what it is worth, to the consideration of those who may feel interested in original solutions and investigations. At all events the straightedge and compass are both used, and no other instrument is needed. Let it be remarked that on the edge of the straightedge (or preferably on a thin sheet of paper capable of serving in its stead) two points, C and A, are laid off by the compass with a distance between them equal to the radius of the construction circle assumed in the problem. The straight edge is slid along point D in such a manner that point A will fall on the prolongation of the diameter, and C will fall on the circumference of the construction circle. The rest is simple, as may be seen from the following proof.

FIG. 1



Let DOB be an angle to be trisected.

With O, the vertex of the angle, as a center, and with any convenient radius, describe a circle.

Prolong one side, as BO, so as to complete the diameter BE, and continue it beyond, at least the length of the radius.

Through D and ending at A in BOE prolonged, let a straight line be drawn such that CA is equal to the radius.

The construction is effected in the manner already indicated above.

Through E and O, and parallel to DA, draw the lines EF and OG cutting the circumference in F and G.

Join F and G respectively with the center O.

(Continued on Page 18)

NEW YORK AND NEW JERSEY NEWS AND ACTIVITIES

NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS, WINTER MEETING, Rochester, March 10th, 1934. Committees Meet—9:30. General Meeting—11:00. All Chapters Expected to Send Representation.

MEETING OF THE EXECUTIVE BOARD

Albany, January 27th, 1934

A meeting of the Executive Board, called by President Chapman, was held Saturday, January 27th, in the Hotel Ten Eyck, Albany. Twenty-five officers, directors and proxies attended. Sixteen counties were included in the representation present.

Five hours were required to transact the business under consideration. A transcript of the minutes prepared by Asst. Secretary Stubbs is too voluminous to permit of reproduction.

Some of the more important items passed upon were:

To date legislation in tentative form only has been drafted.

A lengthy discussion of C. W. A. and P. W. A. matters revealed that Chapters outside of the City of New York play a much more important role in the recommendation for assignments and the establishment of salaries than do those in the Metropolitan District. This is largely due to the illogical form of organization of separate administration units for upstate counties and which attempts to handle New York's 7,000,000 population through one source whilst assigning an individual administration set up for other counties. Reports indicated that every effort is being made to bring about county units in the greater City and the Society is being more and more called upon in connection with the execution of projects and the recommendation of personnel. State Administrator Alfred H. Schoellkopf has advised that only licensed engineers will be accepted for important or responsible positions. The Society has, in practically every county, conferred with and offered proposals to the C. W. A. administrators. The City of New York appears to be in the worst condition. Acceptance of Metropolitan Chapter recommendations is more difficult because of centralized control and national influences, which should confine themselves to fields with which they are familiar.

The Chair was authorized to carry these recommendations to Washington as well as to State headquarters.

A strong appeal, in the form of a resolution, calling for speeding up Public Works Administration, was adopted and the Secretary instructed to forward the same to appropriate agencies.

(Continued on Page 12)

HISTORY OF SUPERVISION OF RELIEF PROJECTS

City of New York
Need for Proper Supervision

BY ONE OF THOSE AFFECTED

In an effort to alleviate personal hardship to thousands of residents of New York, the City of New York carried on until December 1, 1933, a program known as Emergency Unemployment Relief. Streets were paved, sewers were built, buildings were altered, and various other construction projects were carried on. The purpose was to put men to work. This was done as quickly as possible.

And in the haste to get men on the payrolls, and to buy materials with which these men could work, the question of supervision assumed only a secondary importance.

But in June, 1933, Frank J. Taylor, Chairman of the Emergency Work & Relief Administration found it necessary to declare to the Board of Estimate and Apportionment that the program under way could not be carried out efficiently and economically without the supervision of trained civil service engineers and technical employes. The Board, acting on his request, assigned civil service engineers, draftsmen, engineering assistants and inspectors to prepare and take charge of this construction program.

It is now essential to explain how the City of New York found a sufficient number of civil service engineering employes available for this supervision. The reason is simple.

The same conditions which brought about the need for emergency unemployment relief caused a virtual cessation of public improvements. In the offices of the Borough Presidents, there were staffs of civil service employes whose duties consisted of engineering work in connection with assessable public improvements. The salaries of these men were paid out of the appropriations made by the Board of Estimate and Apportionment out of the Street Improvement Fund, a revolving fund which was reimbursed by payments of assessments. When this fund became depleted, through inability of the taxpayers to meet their obligations, there was no money available to continue the employment of the engineering staffs of the Borough Presidents, nor will there be until such time as this fund is rehabilitated through P. W. A. funds or otherwise. The budget of the City of New York makes no provision for payment of the aforementioned employes. Whether

(Continued on Page 13)

CHAPTER NEWS

Raphael J. Smyth, Chairman, Committee on Chapter Activities

ONEIDA COUNTY

Subsequent to the election of Mayor Sloan of Utica but prior to his induction into office, the Oneida County Chapter extended to him its congratulations and its pledges of support and cooperation during the period of his administration of the high office to which he was elected. Coincidentally his attention was courteously called to the requirements of law governing the practice of Engineering in this State and it was further respectfully suggested that either a licensed Professional Engineer or a registered architect be appointed to fill the office of Superintendent of Buildings. When the appointments of the Mayor were announced the Chapter was highly gratified to note that licensed Professional Engineers were appointed to the positions of City Engineer and Deputy Engineer and that a registered architect of high standing was selected to fill the office of Superintendent of Buildings.

A report on the Engineers' Code was submitted by Mr. W. S. Murray, Chairman of the Code Committee at the January meeting of the Chapter. The recommendations of the Bronx County Chapter were, with a slight modification, approved.

Local representatives of the Civil Works Administration attended the meeting. The consensus of opinion, as expressed by the Chapter members, was that the salaries paid to Engineers by the C. W. A. are too low and the hope was voiced that the rates would be raised. It was also urged that only licensed professional Engineers or Land Surveyors be placed in charge of surveying parties employed by the C. W. A.

Mr. E. A. Gruppe, Secretary of the Chapter, reports that the Chapter is enthusiastically cooperating with the C. W. A. and that it has been instrumental in securing employment for many of its members on C. W. A. projects.

* * *

ORANGE COUNTY

The Orange County Chapter held a regular monthly meeting following an enjoyable informal dinner at the Mitchell Inn, Middletown, on January 18th.

The guest-speaker of the evening was Mr. Elwood M. Wilbur of Port Jervis whose subject of discussion was

(Continued on Page 14)

MEETING OF THE EXECUTIVE BOARD

(Continued from Page 11)

Mr. Edward A. McKenna, Chairman of the Constitution Committee, advised that certain criticisms from one Chapter are responsible for the delay in presenting the final report. Copies of the new Constitution are in the hands of the several Chapters.

The work of Mr. Raphael J. Smyth in gathering news and stimulating Chapter activities was acknowledged as was his recent appointment as Engineer of Design for The Bronx.

Through the efforts of Past President Steinman and counsel for the Society more than 150 cases appearing in telephone directories have been investigated with highly satisfactory results.

As a result of discussion relevant to the Code the Board authorized Director Frederick C. Ward of Kings to make a special trip to Washington for the purpose of conferring with Deputy Administrator Weed who is engaged in reframing the Engineers' Code. The position of the Society on the decent minimum pay rates ,representation for sub-professional men, adequate recognition of the State Society on all New York matters pertaining to professional Engineers, elimination of various unfair and vicious proposals contained in previously published codes, remains unchanged. Mr. Sheridan suggested that an effort be made to bring New Jersey, West Virginia, Pennsylvania, Minnesota, Washington, and other states where the nucleus of a real professional Society exists, into a conference for the purpose of Code consideration.

The Board considered the matter of cooperation with the Federation of Architects, Engineers, Chemists and Technicians and other groups which have addressed themselves to the Society on matters pertaining to the Code, C. W. A., and P. W. A.

It was the unanimous opinion of those present that in all instances where objectives are parallel the Society should lend every assistance possible, provided the methods and activities are consistent with the contentions and aspirations of the profession as a whole.

A splendid report from a special committee, headed by A. E. Roche of Rensselaer relevant to the proposed Buffalo, New York Speed Highway, resulted in a resolution to offer an amendment to the measure which is now before the legislature; the said amendment to take the form of a legislative appropriation in the amount of $50,000 for the purpose of making an engineering and financial study of the project, under the direction of the State Public Works Department.

A resolution opposing the transfer of Coast and Geodetic Work to the Army, Navy or other departments, was adopted and the Secretary instructed to forward the same to Washington.

Opposition was registered against the attempts of educational institutions to influence the Board of Examinations for Licensing Engineers. At a conference last summer between the License Board and the several state engineering schools a demand that the Board confine its examinations to the curricula of schools was apparently accepted by the said Board. Such an agreement is in violation of the premises upon which licensing is predicated. The Board should not be influenced by educational groups but by requirements born of knowledge of actual practice. Professional societies rather than schools should be asked to confer on the question of standards for licensing.

It was unanimously agreed that the Society should have a voice in the recommendation of engineers who are to be appointed as members of the Board of Examiners. If this cannot be accomplished through conference with the authorities of the State University then it should and can be effected through legislation.

A resolution opposing the continued diversion of state gasoline and motor vehicle taxes from the purpose set forth in the legislation creating such taxes was passed and the Chair instructed to advise the Governor and the leading legislators of the State. As has been pointed out on numerous occasions the expenditure of such taxes for their intended purpose, viz., state highway construction, would give legitimate work, wages and relief to hundreds of engineers and thousands of other people of the State.

The question of caring for and encouraging sub-professional men provoked an extended and complete discussion of a proposal which has several times come before the Board, and the Society Albany Chapter presented a report setting forth conditions and asking for a decision as to the propriety and advisability of associate or affiliate membership. Comments and opinion from every part of the State resulted in a unanimous vote that no change in the Constitution should be considered. It was pointed out that each Chapter has at present all the authority necessary to permit non-licensed engineers to attend and participate in meetings, without granting membership. Several members referred to sons who are not yet licensed and expressed the belief that much as they personally desired opportunity for their own, the breaking down of the one distinguishing feature of the Society would sound its death knell. It was pointed out that the membership of the Society was but a small percentage of those eligible and the non-member licensee was a large field upon which to concentrate.

Mr. E. F. Fox, Financial Secretary, presented arguments and figures to substantiate the contention that the Society should concern itself with licensed non-members. It was decided to encourage Chapter activities of interest to Juniors and to plead their cause when the case warrants. Mr. McKenna, seeking guidance upon the subject in connection with the preparation of the new Constitution offered resolutions upon both sides of the point in question. The decision to restrict the Society to one class of membership and to maintain high standards for the same, was adopted without a dissenting vote.

The question of the reorganization of county and municipal government was considered at some length. The Chair was authorized by resolution to appoint a special committee to study and report upon the reorganization of such governmental agencies.

The following report was submitted by the Treasurer:

FINANCIAL REPORT N. Y. STATE SOCIETY OF PROFESSIONAL ENGINEERS, INC.

JAN. 1, 1933, TO DEC. 31, 1933

Receipts

Balance on hand, Jan. 1, 1933,		$ 550.78
Cash on hand, Jan. 1, 1933...		.55
Dues	$5,641.50	
Telephone	12.21	
Life Memberships ..	40.00	
Albany Meeting	23.40	
Board Meeting	19.50	
Engrs. Legal Fund..	100.00	$5,836.61
		$6,387.94
Checks returned a/c Bank Holiday		177.50
Total		$6,210.44

Expenditures

Rent	$ 660.00	
Salaries	2,410.00	
Telephone	232.10	
Membership Drives	226.99	
Board of Directors' Meetings	101.65	
Legislation	161.80	
Publicity	497.70	
Office Supplies	198.48	
Printing and Stationery	455.37	
Postage	273.68	
Anuual Meeting and Convention	69.71	
Albany Meeting ...	310.47	
Engineering Council and Code	94.45	
Check Tax	3.84	
Miscellaneous	26.00	
		$5,722.24

Reduction of Debt

On account of Legal Fees...	292.37
Total Expenditures	$6,014.61

Balance on hand, Dec. 31, 1933.....$	193.45	
Cash on hand, Dec. 31, 1933	2.38	195.83
		$6,210.44
Remaining Debt on account of Legal Fees		$750.00

FINANCIAL REPORT N. Y. STATE SOCIETY OF PROFESSIONAL ENGINEERS, INC.

JANUARY 1, 1934 TO JANUARY 25, 1934

Balance on hand, Jan 1, 1934	$ 193.45
Cash on hand, Jan. 1, 1934....	2.38

Receipts

Dues	1,018.00
	$1,213.83

Expenditures

Current Bills	$ 221.70
Balance on hand, Jan. 25, '34	992.13
	$1,213.83

HISTORY OF SUPERVISION OF RELIEF PROJECTS

(Continued from Page 11)

these men are employed or not, the budget remains unaffected.

Consequently many engineers and technical men were thrown out of work through no fault of their own. Some of these men were out of work for six months or more until, in June, 1933, they were assigned to supervision of the emergency unemployment relief program. There was insufficient work, however, to provide for all of the men at full time, with the result that they were re-employed on the basis of twelve days per month per individual, and assigned to work in semi-monthly shifts. In addition to this, many full-time employes were assigned to aid in supervision. The engineering work and supervision by these civil service employes proved to be so necessary and satisfactory to the authorities of the City of New York that their services were continued until the end of 1933.

On December 1, 1933, the C. W. A. assumed the operation of E. U. R. but in the stress of carrying on an ever-increasing program, as was the case when the City of New York initiated the program, supervision was again partially overlooked.

On November 23, 1933, A. H. Schoelkopf, State Administrator of the C. W. A., wrote to the Board of Estimate and Apportionment a request for appropriations and for supervision. Part of his letter follows:

> "In addition to the foregoing, the state civil works administration requests, first, that your Board authorize the purchase of all materials for civil work projects through the central purchasing bureau of the City of New York. Next we would ask that you authorize the use of all equipment belonging to the City of New York and now being used by your work bureau on work relief projects for continued use on civil work projects. Thirdly we ask you to authorize your engineers, departmental heads, foremen, etc., to supervise the civil work projects in the future as they have done in the past in connection with work relief projects Finally, it is requested that the fiscal authorities of the City of New York be authorized to continue to audit payrolls and to draw checks to the employes of the civil works projects as they have done in the past in connection with work relief until such time as a new and different method may be devised for carrying on this work. It is understood that the federal civil works administration will put the New York State civil works administration in funds to meet these payrolls and the state administration in turn will advance to the City of New York the amounts necessary to cover these payrolls as they become due."

The City of New York was willing to continue the employment of its civil service engineers and to be reimbursed later by the Federal Government, but when it made its request to Mr. Travis Whitney, who on December 1, 1933, was appointed New York City Administrator of the C. W. A., Mr. Whitney replied as follows:

> "If these particular men laid off by the city as a part of budget economy were placed on Civil Works Administration payrolls, there would be no reason in principle why the city, or any other city, should not, by reducing its budget, lay off 2,500 or 25,000 employes and ask and expect that they be absorbed by the Civil Works Administration."

This statement indicates a misunderstanding of the true conditions. The men in question as stated before, are not provided for in the budget. Their being laid off is entirely apart from any budget economy.

But it is not apart from economy and efficiency in the administration of the C. W. A.

In the New York Herald Tribune of January 7, 1934, Mr. Robert Moses, long affiliated with public improvements in New York State, made this statement:

> "What is the trouble with civil works? It may be admitted that it avoids some of the stigma of relief and that it puts money into circulation. On the other hand, it is contract work without the contractor. In the main, it is short time, odd job shore work with next to no equipment, with inadequate material and *poor supervision.*"

The responsibility for this poor supervision must be laid at the doors of those in charge of the C. W. A., for it may be overcome quickly, simply and effectively.

In order that thousands of men may be put to work on construction projects without aimless squandering of public funds, engineering services must be provided. Men must be found to design work, to lay it out, to supervise it, inspect materials, and determine beforehand how many men and how much labor can be used on each particular project. Further, the safety of laborers during construction, and of the public after construction, depends on an intimate knowledge of local conditions by those in charge of the construction.

> "Informal information obtained at the office of the Chief Engineer, Civil Works Administration, New York City, relative to the authority and requirements of that body in so far as they have been developed.
>
> * * * * *
>
> *"The Borough Officials are to continue supervision and jurisdiction over construction work on Civil Works Projects."*

The C. W. A. has no authority to advance money for the salaries of the Engineers employed under the Civil Service of the City, only for such Engineers as are on the rolls of the C. W. A. and assigned to the various City offices.

No provision has as yet been made whereby the C. W. A. can prepare plans and specifications for construction on Civil Works Projects, such plans and specifications must be prepared by the City and Borough authorities. It is understood, however, in the event of the continuation of the C. W. A. after February 15, 1934, provision is proposed to be made for establishing a Division of Engineering Design of the C. W. A. to prepare plans and specifications.

To build up an organization capable of handling the vast program now proposed would take many months, during which men must be employed and materials bought.

Yet in the offices of the Presidents of the various boroughs, there are even now all ready to step in and take charge, staffs of trained men, with experience ranging from five to twenty-five years. These are the very men who laid out the lines of the boroughs, who set the monuments and bench marks, who know the topography, who prepared the final maps, and who are familiar with all departmental records which must of necessity be consulted before any work can be done. Again, these men have built the highways and sewers of the boroughs, and know the dangers of construction on each and every street in the boroughs in which they have worked.

Unless their services are engaged for this purpose, they will be laid off to make room for a new, inexperienced group, who, though well-intentioned, cannot by any stretch of the imagination, be as well qualified to do the necessary work as those whom they will displace. The qualifications of the civil service employes as defined by the Civil Service Commission appear on Schedule "A". Their civil service salaries range from $39.00 to $55.00 per week—far from excessive payment for men with the length of experience of these men, as shown by Schedule "B", which refers specifically to the Borough of Queens.

From June to December, 1933, an average of about 6,500 men were assigned as laborers to the office of the President of the Borough of Queens. It is intended to employ under the C. W. A. until February 15, 1933, more than 15,600 men. Similar increases will be applied in the offices of the other Borough Presidents as shown on Schedule "C". The amount of work intended to be done is staggering in prospect. Without full-time supervision by trained civil service employes, the chaos that must result is apparent. Money can be saved, proper results can be achieved, and the federal government, the state and the city can expect a fair return on the money invested in the civil works program only when that money is expended under proper supervision.

As can be seen, the purpose of this writing is to convince and satisfy those whose duty it is to administer the program of the C. W. A. that in the interest of economy and efficiency it is advisable either (a) for the federal government to authorize the City of New York to continue on a full time basis the employment of the civil service engineering and technical employes in the offices of the five Borough Presidents with the understanding, as stated by Mr. Schoelkopf, that "The federal civil works administration will put the New York State civil works administration in funds to meet these payrolls and the state administration in turn will advance to the City of New York the amounts neces-

sary to cover these payrolls as they become due." Or (b) for the C. W. A. to take over, as a group the available engineering staffs of the various Borough Presidents, knowing, as we do, that from June to December, 1933, these men had been paid from emergency funds, and that such a step should have been taken at the inception of the C. W. A. since the entire program now under way, and all previous Emergency Unemployment Relief programs had been prepared and supervised by these employes.

The problem then is to decide whether an engineering personnel composed of qualified and experienced civil service employes is to be supplanted by a new organization of supervisors set up by the C. W. A., who, though well-intentioned, as heretofore stated, cannot by any stretch of imagination, be as well qualified to do the necessary work as those whom they will displace.

* * *

CHAPTER ACTIVITIES

(Continued from Page 11)

"The Power Dams on the Mongaup River." These dams—four in number in Orange and Sullivan Counties—have a combined watershed area of approximately 200 square miles and the lakes which they create have a storage capacity of approximately 6,300,000 cubic feet. The construction and operation of the four hydroelectric power plants were described in a most instructive and entertaining manner. The discussion was highly appreciated by the members present.

Mr. H. C. Carpenter, Chairman of the committee on the "By-passing of trunk line highway traffic around the City of Middletown" made an interesting progress report. The committee has gathered much data, prepared maps and investigated suggested tentative routes. The problem presents many difficulties which the committee is most commendably contending with and overcoming.

Mr. H. L. Felch, Secretary of the Chapter, advises that the principal subject for consideration at the coming February meeting will be "The Temple Hill and Snake Hill Parkway Development" south of Newburgh. This development, which is being studied by a committee under the chairmanship of Mr. William J. Blake, is of particular interest as it involves a territory notable for its historic associations.

* * *

BRONX COUNTY

The Bronx County Chapter held its usual regular meeting at the Concourse Plaza Hotel on January 4th, at which Mr. Joseph F. Lamb, President of the Chapter, presided.

The following members were elected to serve on a nominating committee to select candidates for Chapter offices which must be filled at the annual election in March: Professor Alexander Haring, Mr. Walter E. Addicks, Mr. Arthur V. Sheridan, Mr. John H. Knight, Mr. G. C. Shannon.

A resolution submitted by Mr. A. V. Sheridan urging that all State, County and Municipal Civil Service lists, which had or would, expire during the depression, be extended for a period of four (4) years was adopted.

The Chapter expressed its gratification upon the appointment of Mr. Arthur V. Sheridan, and Mr. Leo Ehrhart, as Chief Engineer and Consulting Engineer, respectively, of the Borough of The Bronx. Mr. Sheridan, as is well known to all professional Engineers of New York, is a Past President of the State Society, and Mr. Ehrhart is a member and former Director of the Bronx County Chapter. All good wishes are extended to these outstanding Engineers who will discharge the duties of their important offices with honor to themselves, credit to their profession, and lasting benefit to the great community they serve.

The announced aims of the new President of the Borough of The Bronx, Hon. James J. Lyons, were formally approved and the cordial cooperation of the Chapter was assured him in his endeavors to advance and promote the interests and welfare of the people of The Bronx.

The 1933 Legislature enacted into law a measure known as the McCall Bill which provides for "consolidating and transferring to commissioners of buildings in the City of New York various powers and duties concerning the inspection of buildings and defining the powers and duties of such commissioners." This statute requires that "Every commissioner of buildings . . . . shall be a competent architect or builder of at least 10 years' experience." The Chapter instructed its Legislative Committee to prepare an amendment to this law which would make professional Engineers, as well as architects and builders eligible for appointment as commissioners of buildings.

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ALBANY COUNTY

Mr. Thomas A. Devane, the progressive and popular president of the Albany County Chapter, advises that "through the courteous cooperation of Mr. William J. Picard, Deputy State Industrial Commissioner and former secretary of the Albany County Chapter, all appointments to Engineering positions under the C. W. A. must have the endorsement of the local Chapter. Among those from this Chapter already appointed are: Mr. Erwin B. Stevenson, director in charge of checking all Engineering projects in this district; and Mr. Ellis Metzner, Executive Engineer in charge of a regional Plan and Survey of Albany County."

Albany County Chapter, through its president, sends cordial greetings to all other Chapters in the State. It is a certainty that this sentiment is heartily reciprocated.

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NIAGARA COUNTY

It was reported in the January issue of this magazine that the Niagara County Chapter had been temporarily organized. Following this, a request has been received at the State Society Headquarters for a charter for the new Chapter which bears the following signatures: Mr. Alfred L. Williams, President, Niagara Falls; Mr. C. A. Tryon, Vice-President, Niagara Falls; Mr. Edward R. Cole, Secretary Niagara Falls; Mr. Richard M. Rumsey, Treasurer, Niagara Falls; Messrs. Leon H. Wendel and Howard C. Young of Lockport; and Messrs. George W. Stone, Harold B. Ransom, J. W. Naylor F. E. LeVan, Hans K. Ritter, Henry S. Steele, Ernest E. Reeves, J. Dovesmith, H. W. Clarke, H. J. Curts, C. W. Collison, Fred B. Oglesby and L. J. Call, all of Niagara Falls.

The charter requested will be presented with due ceremony and a hearty welcome, to the accredited representatives of the Niagara County Chapter at the annual meeting which will be held this year at Rochester, on March 10th.

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ONONDAGA COUNTY

Mr. Everett E. Enos, Secretary of the Onondaga County Chapter, has reported that a Chapter dinner-meeting was held at the Hotel Syracuse on January 8th, at which Mr. Harold Dawson, President of the Chapter, presided, and at which about thirty members were present.

Mr. Arnold G. Chapman, President of the State Society, discussed, most interestingly, the accomplishments of the Society and the problems which lie ahead and are pressing for early solution.

Mr. Guy M. Pinck, Division Engineer of the New York State Department of Public Works, delivered a highly informative and timely address on the merits of the proposed All-American Ship Canal and the St. Lawrence Power Canal.

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RICHMOND COUNTY

News clippings from the Staten Island Advance and other publications, which have been received through the courtesy of Mr. William Massa, Chairman of the Press Committee of the Richmond County Chapter, indicate that the Chapter and the Richmond County Transit Conference (which is composed of representatives of over 100 civic, business and professional organizations) are persistently pressing for the advancement of the construction of a rapid transit facility which will connect the Borough of Richmond, via the Borough of Brooklyn, with the Borough of Manhattan —the center of business activity of the Metropolitan District of New York.

The Board of Transportation of the City of New York, under the stress of the realization "that the Borough of Richmond is the only one of the five boroughs of the City which has not heretofore been included in municipal rapid transit development" recently presented a plan for such development to the Board of Estimate and Apportionment for consideration. The latter Board approved the route submitted and placed it on the City Map. By this action a necessary forward preliminary step has been taken which permits formal consideration of appropriations necessary for construction.

This project, which has been under consideration for fourteen (14) years, has had advances and retreats in its progress toward realization. Sentiment and agitation for it have waxed strongly at times only to wane in dis-

couragement before the forces of opposition. The assumption of leadership a few years ago by the Professional Engineers of Richmond brought to the movement consolidated organization, forceful direction and convincing presentation. And the results thus far achieved under that leadership have been so heartening that the issue will be pressed with even greater determination and enthusiasm.

Mr. Fred H. Zurmuhlen and Mr. Herman W. Ordeman, president and vice-president respectively, of both the Chapter and the Transit Conference, merit the highest commendation of the people of Richmond for their zealous and continued devotion to the cause of better transit for the southernmost borough of the city.

The Richmond County Chapter has for some time been publicly advocating the appointment of licensed professional Engineers to "offices which by their nature call for experience and training of a professional Engineer." The logic of this claim has been recognized by Hon. Joseph A. Palma, President of the Borough of Richmond since January 1st, 1934, in his appointment of Mr. Herman W. Ordeman, as Consulting Engineer, and Mr. George W. Allison, as Commissioner of Public Works of the Borough. Mr. Ordeman and Mr. Allison are, respectively, Vice-President and a Director of the Chapter.

It is the fervent wish of every professional Engineer of the State that the success of these gentlemen in the high offices they fill will redound to their personal credit and vindicate the claims which the Richmond County Chapter and other Chapters have been making,—that all appointees to public office should have proper training and experience (as attested by governmental certificates when legally required) to fully discharge the duties they assume.

Although a list of the newly elected officers of the Richmond County Chapter has not been received we have been reliably informed that Mr. Fred H. Zurmuhlen has again been elected to the presidency of the Chapter. The enthusiastic interest which Mr. Zurmuhlen has maintained for many years in the development of the State Society and of his Chapter has won for him countless friends and well-wishers in the profession throughout the State.

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QUEENS COUNTY

The annual meeting of the Queens County Chapter was held at the Medical Society Building, Forest Hills on January 25th.

The following officers and directors were inducted into office: President, Mr. Andrew K. Johnson; First Vice-President, Mr. George P. Winn; Second Vice-President, Mr. George H. Bruns; Treasurer, Mr. Charles W. McInenly; Executive Secretary, Mr. Martin Nelson; Directors, Messrs. William H. Betram, Edward J. Flanagan, I. W. Conway, Albert Whitehead, John J. Delaney.

The installation ceremonies were conducted by Mr. Arthur V. Sheridan, Past President of the State Society, assisted by Hon. George U. Harvey, President of the Borough of Queens, Mr. Fred H. Zurmuhlen, President of Richmond County Chapter, and Mr. Raphael J. Smyth, Past President of the Bronx County Chapter.

The speakers gave deservedly high praise: to the Chapter for its activities in the interest of the proper development of the County, and the advancement of the profession; to the new officers for their services which won for them the distinctions conferred upon them by their fellow Engineers; to the retiring officers for their devoted and successful efforts in raising the Chapter to new heights of efficiency and usefulness.

A particularly noteworthy tribute of esteem was paid to Mr. Johnson, the newly elected president. Mr. Johnson is a member of a Sub-Committee (of a Special Committee appointed by the Board of Estimate and Apportionment of the City of New York) on Standard Highway Specifications, which will govern the construction of all assessable improvements in the five (5) boroughs of the City. Members on this committee from all boroughs attended this installation ceremony as a mark of their high regard for their fellow committee member, Mr. Johnson. They were: Col. Willis R. Tenney, Chief Engineer of Highways of the Borough of Brooklyn; Mr. William B. Grubbe, Construction Engineer of the Borough of Richmond; Mr. Louis Furtnett, Section Engineer of Design of the Borough of Manhattan; Raphael J. Smyth, Engineer of Design of the Borough of The Bronx. There were also present Mr. Joseph P. O'Dea, Deputy Chief Engineer of Highways, Borough of Brooklyn, Mr. Ray Pennyfather, Assistant Engineer of the Borough of Queens, each of whom served as alternates on the committee. Mr. Warren R. Borst, Sewer Engineer of the Borough of Richmond, and a member of the Special Committee of the Board of Estimate and Apportionment, also attended and extended his congratulations to Mr. Johnson.

Hon. George U. Harvey, President of the Borough was long and loudly applauded for his complimentary, graceful and, for the most part, serious address. The Engineers of Queens have a warm friendly feeling for their Borough President, and convincing evidence has been given on many occasions that that sentiment is as warmly reciprocated.

It was indeed a gala occasion. Members and guests were caught up and swirled along upon a flood of oratory during the meeting, after which they were speedily guided to tables groaning under the bountiful weight of irresistibly delicious refreshments. And under the combined influences of inspirational eloquence, savory gustables and exhilaratingly potent potables the spirits of good fellowship held high carnival. Yea, it can verily be said, That the sons of Queens are Kings of hospitality! "And that nobody can deny."

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CHAUTAUQUA-CATTARAUGUS COUNTIES

The Chautauqua-Cattaraugus Counties Chapter held its annual meeting at the Y. M. C. A. building in Jamestown on January 10th.

Mr. R. B. Lyon, Secretary-Treasurer of the Chapter, reports that the programs of the Civil Works Administration, particularly as they affected the Engineers of the two (2) counties, were the main topic of interest and discussion. The Chapter has submitted the names of all licensed Engineers and Land Surveyors in the two (2) counties to the C. W. A. authorities and, in response to calls made upon it, has recommended Engineers for service upon some of the projects undertaken. The Chapter has given, and will continue to give, the heartiest cooperation in this splendid enterprise.

The following officers and directors were elected: President, Mr. Walter F. Shaw, of Jamestown; Vice-President, Mr. George L. Purdy of Olean; Secretary-Treasurer, Mr. Richard B. Lyon of Olean; Directors for two (2) years, Mr. M. H. Regan of Salamanca and Mr. C. Eugene Bentley of Jamestown.

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MONROE COUNTY

The annual meeting of the Monroe County Chapter was held at the Powers Hotel, Rochester, on January 15th.

The following officers and directors were elected: President, Mr. Charles W. Marvin; Vice-President, Mr. Howard S. Thomas; Secretary-Treasurer, Mr. R. H. Hendrickson; Directors for two (2) years, Messrs. S. Firestone, A. P. Mussi and William R. Storey.

A resolution was adopted recommending that the expiration dates of Civil Service lists of eligibles for appointment to Engineering positions be extended for one (1) year. The Secretary-Treasurer was instructed to forward copies of the resolution to the proper authorities and to the Civil Service Employees' Association which is a very strong local organization.

Mr. Howard S. Thomas, Chairman of a special committee appointed to cooperate in the advancement of C. W. A. projects, reported that his committee had assisted in the establishment of approved qualifications for Engineering positions and had succeeded in securing the appointment of a considerable number of Engineers to posts of responsibility. Mr. R. H. Hendrickson, Secretary-Treasurer, reports that the Chapter has been gratified to learn that the local administrator is well pleased with the recommendations made by the Chapter. A letter has been addressed to the C. W. A. authorities suggesting and offering expanded chapter cooperation in phases of work in which Engineers can render peculiarly valuable assistance.

A committee was appointed to urge that the work of monumenting the roads of Monroe County—for which an appropriation has been made—be progressed with the utmost dispatch.

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SCHENECTADY COUNTY

Mr. Arthur Blessing, Secretary-Treasurer of the Schenectady County Chapter, has forwarded the sad news that the Chapter has recently lost by

death two of its most distinguished members and past directors, Mr. William B. Potter and Mr. Herbert D. Schutt.

Commenting on the death of Mr. Potter, the Schenectady Gazette states in a lengthy news article that "Another of the generation of American electrical pioneers passed away in the death of William Bancroft Potter, retired General Electric engineer, and long the head of the company's railway engineering department."

"Mr. Potter was one of the best known electric traction Engineers in America. His career went back prior to 1890, when electric street cars were still struggling to overcome technical difficulties and public prejudice. His contributions to the electric traction art were substantial and long continuing. Many of them were covered by the 130 patents which had been issued in his name."

In 1894 Mr. Potter went to Schenectady when the main offices of the General Electric were established there. The following year he was appointed as Engineer of the railway department and continued in that position until his retirement from active work in 1930. "In that long interval he witnessed and aided materially the tremendous expansion of electric traction in the street railway and interurban field, and also participated in the earliest installations of electrical equipment upon the lines of steam railroads.

"The major projects in which he was associated were the electrification of the Manhattan elevated railway of New York, the electrification of the Grand Central Terminal, and the Paris and Orleans Railroad in France."

Mr. Herbert D. Schutt was one of the honor graduates of Union College in the class of 1909. He was a member of the Sigma Xi, a national honorary scientific society and was active in a number of engineering organizations in the state.

Mr. Schutt had just recently been put in charge of a group of engineers who are planning project work under the Schenectady administration of the C. W. A. program.

The New York State Society makes grateful acknowledgment of devoted services rendered to it and to the profession by two of its most brilliant members, Mr. William Bancroft Potter and Mr. Herbert D. Schutt, who have recently departed this life, and extends its sincere sympathy to their bereaved relatives and friends.

Mr. Werner C. Strecker, Captain Engineers Reserve Corps, former Secretary of the Schenectady County Chapter, was appointed on January 20th to the command of Camp No. 51 of the Civilian Conservation Corps at Deposit, New York.

Captain Strecker's present duties make it impossible for him to be as active in State Society movements as he was formerly when he earned the reputation of being a "live-wire" in organization matters. However, it is anticipated that those activities will be resumed when "normalcy" returns —which will not be long now.

Congratulations, and best wishes for success in his new office, are cordially extended to Captain Strecker.

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STEUBEN AREA

The Steuben Area Chapter held its annual meeting at the Baron Steuben Hotel, Corning on January 9th.

The officers and directors elected were: President, Mr. S. B. Ehrenrich of Hornell; Vice-President, Mr. M. W. Wipfler of Elmira; Secretary-Treasurer, Mr. H. F. Eilers of Corning; Directors for three (3) years, Mr. W. O. Drake of Corning and Mr. A. C. Jordan of Elmira.

A rising vote of thanks was given to the retiring president of the chapter, Mr. W. O. Drake, for his enthusiastic and untiring services in the advancement of the professional status of the Engineers in the Steuben Area.

Hon. James P. Halahan, City Commissioner of Corning and guest-speaker of the occasion, paid a graceful tribute of admiration to the Engineering profession and the great public facilities it has created for the public service, convenience and progress.

The Arrangement Committee is preparing a program of addresses by prominent speakers for the entire year Upon completion, these programs will be printed and sent to all the Chapters throughout the State with invitations to all State Society members to attend the Steuben Area Chapter's meetings at which they will be delivered.

It is reported by Mr. H. F. Eilers, Secretary of the Chapter, that 47 names are now inscribed on the membership roll and that nine (9) Chapter meetings were held during 1933 with an average attendance of forty (40) members and guests. That is a proud record of achievement for so young a Chapter. May it prosper even more in 1934 which—unless all signs fail—will go down in history as the Year of Recovery.

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WESTCHESTER COUNTY

Some time ago the Westchester County Chapter was invited by the National Reemployment Service to collaborate in the work of classifying applicants for Engineering employment under the Civil Works Administration. Mr. John Avery, President of the Chapter, eagerly embracing the opportunity, designated Mr. Andrew M. Anderson, Recording Secretary of the Chapter, to assist in this work. The Chapter representative cooperated effectively and, as a result of the careful consideration which was given to the qualifications of applicants, a large number of professional Engineers were placed in positions of authority and responsibility for which they were best fitted by training, knowledge and experience.

The January meeting of the Chapter was addressed by Mr. J. D. Lee, of the United Air Lines, and Mr. A. R. Platt, Manager of the Westchester National Reemployment Service.

Mr. Lee illustrated his very interesting discussion of transcontinental air travel by motion pictures taken on a coast-to-coast trip. Replying to a question as to the possible future of the proposed Westchester Airport, Mr. Lee expressed his opinion that, in the event of its designation by the Postal authorities as a central mailing point, it might eventually become New York City's principal airport.

Mr. Platt most informatively described, in detail, the work done by the National Reemployment Service in registering and classifying applicants for C. W. A. work. He acknowledged that the proper classification of Engineers would have severely tested the resources of his staff, and expressed his warm appreciation of the assistance rendered by the Chapter in this branch of N. R. S. activity.

Mr. Arnold G. Chapman, and Mr. Fred H. Zurmuhlen, President, and Chairman of the Membership Committee, respectively, of the State Society, have been invited to address the February meeting to which all non-member Engineers of the county will be invited.

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PASSAIC COUNTY, NEW JERSEY

The following report has been received through the courtesy of Mr. I. Levine, Secretary of the Passaic County Chapter.

"The January meeting of the Passaic County Chapter was the most enthusiastic and best attended of any meeting to date. It was held Thursday night, January 25th, 1934, at the Public Service Electric Building, Paterson, with 34 enthusiastic members present.

"The meeting was opened at 8:00 o'clock and after a short business session the speaker of the evening, Mr. J. Hammond, Vice-President of the Citizens Trust Co. of Paterson, was introduced by Mr. George Curtiss. His address on "The Present Economic Situation and Banking" was most interesting with an explanation of the present Temporary Banking Insurance Law and the proposed Permanent Banking Insurance Bill. At the close of the address chapter members asked many questions relative to the present banking situation which were gladly explained by Mr. Hammond.

"Coffee and doughnuts were served at this point in the proceedings by our efficient Entertainment Committee headed by Fred Loede, and the members enjoyed a friendly and informal half hour. Upon resuming the meeting, Mr. Archie Doolittle, one of the County Directors for the C. W. A., explained its organization activities and undertakings in this county since its inception. Considerable discussion prevailed on the new Federal ruling that union labor employed on C. W. A. activities hereafter will receive the current rate of wages as established under contracts between their respective unions and employers' organizations. The fact was brought out that this is unfair to the Engineer executives who are directing C. W. A. activities in that they have received no recognition and will continue to work under the original hourly rate. A resolution was drawn up to this effect for presentation to the Board of Trustees of the State Association at their meeting on Monday, January 29th, 1934.

THE
TULANE UNIVERSITY
LIBRARY
NEW ORLEANS

LOOKING AROUND AND LOOKING AHEAD

(Continued from Page 10)

tation facilities already available and mile upon mile available for the building of a great city, planned, studied and laid out before turning a spadeful of earth and capable of supporting, if necessary, 720,000 workers and a population of 5,000,000.

All of these things and an infinite variety of others are found under the great seal of the State of New Jersey. Yet of these bounteous gifts of nature and of these circumstances we have made but little use. Some of them we have seen cursorily; a few have we really lived with and drawn inspiration from.

We think we have seen the Palisades of the Hudson if we have but glimpsed it from a ferry boat. We talk glibly of the gorge above High Bridge through which tumbles the south branch of the Raritan, or of the Delaware Gap with its blue tinted hills, after spending minutes dashing by them in an automobile. We hasten past the nose of North Caldwell Mountain or through the Valley of the Ramapo, thinking of other less beautiful things: and again our knowledge of them and of the magnificient highland area comes from picture or printed page.

But a new day is coming, a day of greater leisure for the average man, and the opportunity for a more intelligent use of that leisure. The tremendous resources, scenic and esthetic, that we have, must be fully utilized. Their proper use involves a variety of problems which cannot be solved unless looked upon and treated in a comprehensive manner. First we must preserve these resources for future generations. We have already made notable beginnings along this line. Our existing system of state parks and monuments and our forest lands already assure for all time to future generations the preservation of the natural beauty and wonders, and historical value that are contained in these areas.

The preservation of Jockey Hollow Park and its Revolutionary Encampment, all too long postponed, is the assurance to posterity that we will not fail to create more state parks. We must build more state monuments, others besides those already exisiting must be held sacred for future generations. We must add to the state forests. In doing this we shall be working along sound economic lines. Most of the areas that are adapted for state parks, monuments and forests are ill adapted for agriculture. Sub-marginal lands on which people in vain have been trying to eke out an existence can be made to serve an economic purpose while farmers struggling to raise valuable crops from sterile soil can be moved to other lands, of greater productivity.

While some of us are busy piling up sand bags to repair the breach through which the water has been rushing to our economic distress, it is sound statesmanship for others to provide for the orderly growth of the region in which we live.

In the northern part of the state within the section known as the metropolitan area, the trail has already been blased by the studies and proposals incorporated in the Regional Plan. The principles of this plan might well, and will be applied to the entire state.

The making of the Regional Plan, involving study and research by experts that occupied more than nine years was financed by the Russell Sage Foundation. It has been presented to the public as a free will offering, with no provisions attached.

The Region as planned takes in all of greater New York, Nassau, Suffolk, Westchester, Putnam, Rockland and parts of Dutchess and Orange counties in New York State; Bergen, Passaic, Essex, Hudson, Union, Morris, Somerset, Middlesex, and nearly all of Monmouth County in New Jersey as well as part of Fairfield County in Connecticut. It covers 5,528 square miles and includes about 500 separate communities. It proposes a trunk line railroad system consisting of a great outer railway belt line passing around the heart of the Region at an average distance of about 20 miles from Manhattan's City Hall. This line would be supplemented by inner belt lines and other connections planned for the express purpose of bringing all railroads into direct contact with every harbor and industrial district while at the same time permitting traffic to other points to be routed around the congested sections.

In connection with rapid transit it proposes a single system for the entire region which operating as a unit would in most cases carry the commuter "from within walking distance of his home to within walking distance of his place of employment."

The proposed highway system is somewhat similar in design to the trunk line railroad system layout. It consists of a great loop called the Metropolitan Loop which encircles the main business sections and which is about 12 miles from City Hall in Manhattan. Within this master loop are 12 connecting routes and outside of it are 20 so called Radial Routes that reach out to the far edges of the region. With other secondary branches the scheme is augmented to 29 supplementary major and 107 minor highways. Tied in to this system is a chain of parkways and boulevards which offer an adequate park system consisting of compact parks and ribbon parks.

The individual in the State of New Jersey can no longer be considered as living unto himself. The comfort, happiness and financial well being of each of the state's 4,041,334 people are directly affected by the condition of his neighbor even though that neighbor is at the opposite end of the state.

Similarly the problems of each of the state's counties, cities, boroughs, and villages are closely related. Each governmental unit is not necessarily equipped with facilities for recreational purposes or for the economical establishment of a water supply system. Yet each individual in each municipality has the same right to these and the other privileges which the state has the power to distribute.

It is reasonable then to suggest that a planning agency should be set up by the state. This agency would take stock of and be capable of determining proper sites, services and future needs based upon existing conditions and future probabilities.

No one will admit that New Jersey is not rich in potential wealth and in opportunities. Every New Jersey citizen will agree that the future holds every indication of greater wealth and opportunities. The people of the state and of each county and municipality of the state have a right to expect that the opportunity for progress will be properly developed; that natural resources will be fully utilized.

They have a right to expect that recreational areas will be laid aside for every one; that natural sources of water will be developed and made available to all the people; that rivers will be used but not polluted; that highways will be built but in the proper places; that costs will be paid but by those who benefit. They have a right to expect that some agency will be set up to look around and ahead and to prevent the bickering, dickering and petty jealousies that retard orderly growth. Their rights should be respected.

* Commissioner—Passaic County Planning Commission Member of Engineering Advisory Board, N. J.State League of Municipalities.

* * *

SPORTS OF THE TIMES

(Continued from Page 10)

neers, and that's one for our side, meaning the C. of E. Next below him in the general direction of the great West Point football team of 1933 was Major Gen. William D. Connor, superintendent of the Military Academy.

Military Qualifications

General MacArthur was a baseball player in his days on the Plain, but any man raised in the Corps of Engineers can grasp the fundamentals of football, of course, and learn how to apply them to best advantage. Major Gen. Connor didn't have to study up for the recent campaign. He was football captain on the Plain in 1896 and was known as "Sweet Katy" Connor for his feats on the football field, though he blushes a bit now when that nickname is recalled. He was mentioned for All-America honors by the late Walter Camp.

Stepping down a little further, there is Major Ludson D. Worsham, graduate manager of athletics at the Point. Corps of Engineers, of course. The situation being so gloomy, they were taking no chances. Army had lost almost all its regulars of the previous season. The team was facing a hard schedule. It was rumored that Navy was hopeful of running over the Army trenches with a strong landing party.

This was no time to have a blundering artillery chap or a philandering Air Corps dandy at an important post like that of graduate manager of athletics. The term of Major Phil Fleming, C. of E., had expired. They took great care to put another Engineer officer in his place. These are the de-

tails by which the success of a great campaign is determined.

The Lost Lieutenant

There were some fairly good teams at the Point when Major Gen. William R. Smith (Artillery) was superintendent, Captain L. MaC. Jones (Artillery) coach and Major Ralph Sasse (Cavalry) an assistant on the coaching staff. Major Sasse did well when he became head coach.

But Major Gen. Smith retired, Biff Jones moved along and, more recently, Major Sasse went to the War College. These chaps moved out and the Engineers moved in, causing one hard-bitten campaigner to remark:

"Yes, nothing but Engineers at the Point now. All the soldiers have gone."

When it was announced that the youthful Lieutenant Garrison H. Davidson (C. of E., naturally) would be head coach of the football team, the same hard-bitten campaigner referred to the new head coach as "the lost lieutenant." He may have been lost, but it didn't take him long to find himself.

No Malice

What Gar Davidson did with his troops is now military and gridiron history. He was an able instructor and an inspiring leader, but no less was expected of him. It's an unwritten rule of the army that there is only one thing to do when a serious situation arises: Send for the Engineers.

This, briefly, is the inside story of the successful campaign of the Army football team of 1933. It was a smart campaign with the Brains Trust (otherwise known as the Corps of Engineers) of the Army directing it.

This is merely a matter of giving credit where credit is due and the report is issued with malice toward none—not even toward the Chemical Warfare outfit; certainly not toward the artillerymen, for whom there is always a place-er-somewhere in the background, technically known as the supports. In digesting this report readers are asked to pay no attention whatever to that noisy group in the background singing:

"Oh, the cavalry, artillery and the
blooming engineers;
They couldn't lick the infantry in a
hundred thousand years!"

* * *

THE TRISECTION OF AN ANGLE

(Continued from Page 10)

Then will angle GOB=angle FOG=angle DOF=1/3 angle DOB.

Q. E. F.

Proof

Let C represent the point where DA intersects the circumference.

Join C with O and with B. Join D and E.

Angle CBO=angle CDE (Being measured by half the same are CE)

In the isosceles triangle COB, angle BCO=angle CBO (In an isosceles triangle the angles opposite the equal sides are equal).

Angle COE=angle CBO+angle BCO =2CDE. (The exterior angle of a triangle is equal to the sum of the two opposite interior angles).

In the isosceles triangle OCA, angle A=angle COE.

Therefore angle A=2CDE (Axiom 1).

Angle DEB=angle CDE+angle A= 3CDE=3/2 A.

Hence angle A=2/3 DEB.

But angle DEB=½ DOB (Being measured by half the arc which measures angle DOB).

Therefore angle A=1/3 DOB (Being 2/3 of its half).

Furthermore, angle GOB=angle FEB =angle A (Being exterior interior angles of parallel lines).

Arc BG, which measures angle GOB,=1/3 arc BD.

½ BF measures angle FEB. Therefore BF=2BG, and FG=BG=1/3BD whence FD=1/3BD.

Therefore angle GOB=angle FOG= angle DOF (Being measured by equal arcs).

Q.E. D.

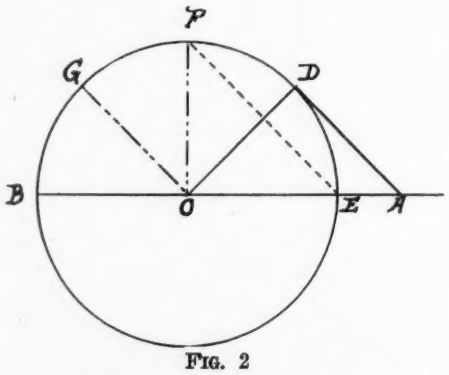

Fig. 2

It will be seen that, when angle DOB becomes 135°, the exterior and the interior segments of secant DCA become merged in the tangent DA.

Points F and G are still obtained as already explained.

But when the angle is greater than 135° this method can not be applied directly. For angles slightly less than 135°, the shortness of the interior segment DC makes a physical trisection difficult, although the geometric principle remains perfectly true.

Therefore, for angles between 135° and 180° necessarily, and for angles between 100° and 135° preferably, select one of the two following methods.

1. Let angle DOE be angle to be trisected.

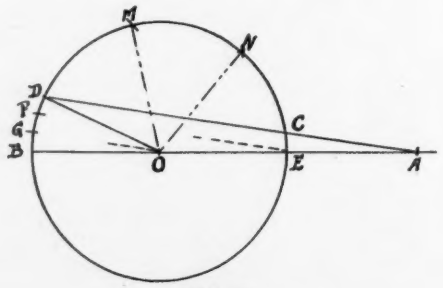

Fig. 3

Trisect the supplement DOB.

Then from F with a radius equal to the radius of the circle strike off arc M. DM will be 1/3 of arc DME.

Q. E. F.

The chord equal to the radius subtends an arc of 60°.

1/3 180°=60°.

1/3DOE = 1/3(180° — DOB)=1/3 180°—1/3DOB.

Q. E. D.

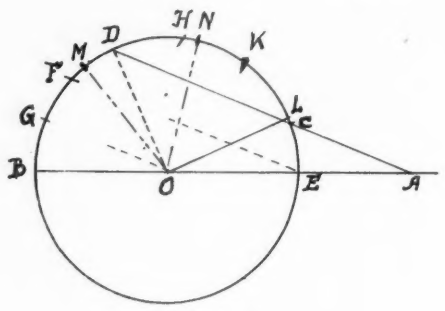

Fig. 4

2.

Let BOL be the angle to be trisected.

Draw radius DO making angle DOL=90°.

Trisect angle DOL and angle DOB.

1/3 DOL+1/3 DOB=1/3 BOL.

Take GM=DH.

BG+GM=BM=1/3 BOL.

If the angle is greater than 180° and less than 270°, trisect the given angle minus 180°. To 1/3 (angle—180) add 60°.

If the angle is greater than 270° and less than 360°, trisect angle minus 270°. To 1/3 (angle—270) add 90°.

In the light of the preceding proof, the following modification, available in the trisection of small angles—say less than 40°—becomes self explanatory:

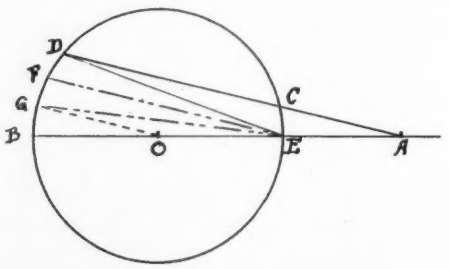

Fig. 5

Let DEB be the angle to be trisected.

Take a convenient center, O, on one of the legs of the angle, and describe a circle whose circumference passes through the vertex E.

Draw DCA as in the previous demonstration, making CA equal to the radius OE.

Angle EDA is 1/3 of Angle DEB.

Through E draw EF parallel to DCA.

Through O draw a parallel to DCA, cutting the circumference in G. Join G and E, and angle DEB is trisected.

Q. E. F.

Angle BOG=Angle BEF=Angle BAD.

Angle BOG is measured by arc BG.

Angle BEF is measured by ½ BF. Therefore GF=BG.

Angle BAD is measured by ½ (BD —CE). Since FED= EDA, CE=FD.

Therefore ½ (BD-CE)=½ (BD—FD)=½ BF=BG.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

Nominations For Officers

The National Nominating Committee of the American Institute of Electrical Engineers, consisting of members from various parts of the country, has nominated the following official ticket of candidates, for the offices becoming vacant August 1, 1934:

For President, J. Allen Johnson.

For Vice-Presidents, North Eastern District: W. H. Timbie; New York City District: R. H. Tapscott; Great Lakes District: G. G. Post; South West District: F. J. Meyer; North West District: F. O. McMillan.

For Directors, F. Malcolm Farmer, Nevin E. Funk, H. B. Gear.

For National Treasurer, W. I. Slichter.

These official candidates, together with any independent nominees that may be proposed later in the manner specified by the constitution and by-laws, will be voted upon by the membership at the coming election in the spring of 1934.

* * *

FEDERATION HOLDS MASS MEETING

New York, January 26th, 1934

Notices of a mass meeting of Architects, Engineers, Chemists and Technicians, held on the above date, listed the New York State Society as cooperating in the holding of the said meeting. Such advertising was not only incorrect but unfortunate.

The meeting in question was arranged for and conducted by the Federation of Architects, Engineers, Chemists and Technicians. Upon request of this body, a committee from the New York State Society, which committee had been appointed by President Chapman to arrange for a meeting to be sponsored by the five Chapters of the City of New York, conferred with the representatives of the Federation. Insomuch as the said Federation had already called a mass meeting, the purposes of which corresponded in some respects to the object of the joint Chapter meeting, the State Society postponed its plans and agreed, upon the express understanding that it would in no manner, shape or form be advertised as sponsoring or conducting the meeting, to send two speakers upon proper invitation to set forth the aims and efforts of the Society in connection with the present C. W. A., P. W. A. and Code problems.

Despite the improper and uncalled for use of the Society's name, the committee attended the said meeting and Past President Sheridan addressed the assemblage upon the request of President Chapman. The large attendance and enthusiastic response indicates clearly that the pleas of the New York State Society, ignored in the most vital instances by the American Society of Civil Engineers Code Committee, were born of close contact with actual conditions.

The Federation, which would never have come into being but for the obstinate and selfish stand taken by the Code Committee, has to-day assumed nationwide proportions. It is all too obvious that a new national body, one that is responsive to the wishes of its members, must be created if the profession is to be preserved.

* * *

When A Code?

(Continued from Page 3)

that is in accordance with our license law.

"Respectfully submitted,
"(sgd.) Frederick Ward."
"Feb. 10,1934.

As an Engineer of prominence, as a successful contractor, and as a citizen active in civic affairs, Mr. Ward must be regarded as one competent to voice an opinion.

It is indeed an unhappy situation that finds the Engineer unable to regulate himself. His fate must rest with others. How long can the profession endure the direction of non-engineers? Can one picture the legal or medical professions compelled to submit their destinies to laymen?

The Engineer is responsible for every unhappy situation in which he finds himself. There is nothing to be retrieved by criticism, unaccompanied by recommendation. The efforts of those who labored to create a Code were none the less because of failure. Rather must the result be attributed to fundamental incapacity for the task.

The Society which sponsored the coding, and the individuals who undertook it were, on the whole, engaged in a work for which they had little background of experience and less understanding of the humanities. With all due respect to the National Societies, which have contributed so much to the art of engineering, such bodies have neither heart nor appreciation for comprehensive consideration of social, economic and professional problems. The formulation of a code, which must embody the elements essential to alleviation of conditions or an adjudication of contentions, calls for the services of socially minded Engineers. That there are such in the great National Societies no one for a moment doubts, but in the selection of personnel for consideration of social problems they are seldom nominated.

The need for a socially minded professional society is becoming more and more urgent. With the extreme left and right wings, as represented by the Founder Societies and by the newly formed Federation of Architects, Engineers, Chemists and Technicians, respectively, a national body composed of strictly professional State Societies looms upon the horizon. Kentucky, West Virginia, Minnesota, Oregon, Massachusetts, Connecticut and others are contacting the New York State Society and only the exigencies of the present financial situation delay the formation of an organization responsive to the opinions and wishes of its members.

* * *

Engineers and Unity

(Continued from Page 4)

promptly for any measure so devised. If such a society existed it would be the sort of thing envisioned by "20-Story" Kneisel. (Arthur Kneisel former Secretary, American Association of Engineers). His ideal 100,000 would be ready to speak authoritatively in Washington today for the whole profession through their society—an objectification of professional unity—and to make available in a national emergency the complete man power of engineering, at the same time safeguarding the rights of the individual members and the standing of the profession.

* * *

The Lives of the Engineers

(Continued from Page 5)

invention has had to wait until the world caught up with it. In the first case the successful inventors have met with honor and wealth — Watt, Stephenson, Bell, Edison. In the latter case the inventors have died disappointed and defeated in spite of great contributions. Oliver Evans is a splendid example.

One of the greatest benefits from the trip of The American Society of Mechanical Engineers to Germany in 1913 was the interest aroused in engineering history and biography through Dr. Conrad Matschoss, the Verein Deutscher Ingenieure, and the Deutsches Museum. The Newcomen Society has been a delight and an inspiration to all who have known its friendly contacts. Its meetings bring out the strong appeal which engineering history has for engineers. There is enough in common in the problems and accomplishments of engineering to make them interesting to all engineers. All are interested in tracing the history of the steam engine through the hands of the military engineer, Savery; the Dartmouth blacksmith, Newcomen; Humphrey Potter, the lazy boy who tied the cords operating the valves; and Watt, the instrument maker. The same is true of the development of the locomotive by Trevithick and Matthew Murray and Blinkinsop to George and Robert Stephenson.

Major inventions have usually been developed by a succession of men who have built on each other's work. Many inventions have been made independently by several men in widely separated places, often almost simultaneously. Practically every industrial country has its inventor of the screw propeller and the electric telegraph. As Smiles has pointed out, the invention of the steamboat is claimed for a Spaniard, a Frenchman, an Englishman, two Scotchmen, and four Americans. That of the spinning machine has been attributed to Paul, Wyatt, Hargreaves, Higely, and Arkwright, the balance spring to a Dutchman, a Frenchman, and an Englishman. There is scarcely a detail of the locomotive which has not been subject to dispute, as for instance the exhaust blast pipe, which has been claimed for Trevithick, George Stephenson, Gurney, and Hackworth; the tubular boiler for Seguin, Stephenson, Booth, and James; the link motion for Gray, Williams, and Robert Stephenson. In fact, the cotton gin seems to be the only major invention clearly attributable to one man and one man only, Eli Whitney. The steam engine was in evolution for a hundred years and the

steam locomotive for a generation, and almost a dozen men seem to have applied steam to navigation independently. The automobile is an assembly of inventions covering nearly a century.

Who, then, can be considered the ininventor of one of these great improvements? Many of them, such as the steam engine and locomotive, should not be spoken of as the work of one man. Where one man is generally associated with a great invention it is usually found that he was the one who first embodied it in such proportions and design as to make it economically available. Fulton is an instance; he was by no means the first to visualize the steamboat or to build and operate one, but he was the first to demonstrate clearly its economic possibilities.

There are a few good general histories of invention and engineering, such as Usher's "History of Mechanical Inventions." Ewbank's history of hydraulics is fascinating. I would recommend also Vowles' "The Quest of Power," from prehistoric time to the present day. But in the main the material lies in biographies and, as indicated above, it is more interesting and vivid in this form. The Engineering Library has scores of engineering biographies, including all which have been sponsored by our own Society. There are collections of lives by Fitch, Howe, Iles, Goddard, and others. The best is the series by Samuel Smiles, particularly the "Boulton and Watt" and "The Stephensons," as well as the autobiography of James Nasmyth edited by Smiles; and a very good book, little known, "Industrial Biographies," which gives the growth of the iron and steel industry and the lives of the great tool-builders, Bramah, Maudsley, Roberts, Nasmyth, Whitworth, and Fairbairn. There are a number of lives of Watt. The best known is that by Smiles. Probably the most complete is that by Dr. Henry W. Dickinson.

The Transactions of the Newcomen Society, beginning in 1920, is a mine of curious and interesting history and biography, both English and American. For those who can read German, the "Beitrage zur Geschichte der Technik und Industrie" is a scholarly and authoritative collection of papers in this field. They have been edited by Dr. Conrad Matschoss, who is widely known in this country, and they reflect his own breadth of vision and catholic sympathies.

Personally, I have had so much satisfaction from browsing in this field that I can wish nothing better for a brother engineer than that he settle himself with a pipe, under a library lamp, and trace the growth of his profession through the lives of those who have created it. It will increase his pride and satisfaction in it.

* * *

Civilian Conservation Corps

(Continued from Page 6)

pines. Not only the white pines native to New York State but fourteen other species of the genus Pinus which have needles in clusters of five are subject to the blister rust blight. The ravages of this fungus disease have spread to many states of the Union and have destroyed an incalculable amount of natural wealth in sections other than New York. More recent reports indicate that blister rust has reached the west coast. The control of blister rust therefore, became a part of the activities of camps other than ours at Davenport. While it may be unnecessary to emphasize the value of the work done in the protection of white pines, for they are the most valuable of all forest trees, it may be timely to indicate briefly the manner in which the protective work is carried on.

Since the blister rust blight is spread by host plants of the Ribes family, that is to say the various species of gooseberry and currant plants, it is necessary to uproot and hang up where the roots will not come in contact with the soil, all Ribes bushes within the stated area of a white pine stand if that stand is to be protected. These bushes are left hanging and finally they die after which there can be no further danger. This stated area in the open is 1500 feet in any direction from the pines and 400 feet in woodland. In the work of protecting the 1300 acres of white pine near Davenport, it was necessary to eradicate gooseberry and currant bushes from some 3400 acres. In this work there were approximately 125 men engaged daily, divided into crews of from 10 to 14. Before passing to other phases of the forestry work, it may be of interest to note briefly a few other points concerning this blister rust disease. It was first introduced in this country from Austria in 1905 and was first discovered at Geneva, N. Y. The rust was carried by importations of white pine seedlings. The introduction to this country of many pests and blights such as the gypsy moth and the chestnut blight, which latter blight was introduced from China in 1909, caused the creation of the Federal Board of Horticulture in 1912. In its system of inspections at source and destination the work of this board is now effective in excluding many foreign plant diseases. So widely has the blister rust spread in this country, however, that its complete extermination is altogether improbable. The best the Forest Service can hope for is to reduce it to the "tolerable nuisance" status. The Forest Service is bending every effort in that direction.

From blister rust, which work ended on September 4th, the camp began the work of reforesting State owned Hewitt areas. These areas comprise lands of a marginal nature, that is to say, land more suited to timber culture than to agriculture. Land of this character has been and is being rapidly abandoned in New York State. That such land might not lie as an economic loss to the State, Senator Hewitt wrote a bill to bring it back to a useful and vital service, the growth of merchantable timber. This is one of the main objectives in all forestry work. The Hewitt areas stand in distinction to other State owned lands such as the Adirondack and Catskill State Parks wherein lumbering is not permitted. There are, of course, other important reasons why the planting of trees became an important part of the work at Davenport. A sufficient cover of trees prevents surface erosion, gullying and the washing away of surface soil which has been many centuries in forming to support plant life. A study of deforested lands in the Appalachian Mountains indicates that as much erosion occurs there in a single year as occurs in one hundred years where the land has a protective covering of trees. Not only do trees protect the soil but they are havens for perching birds of the forest. Since the birds of many species and the young of all species feed on insects, their value cannot be estimated. Not only birds but other forms of animal life find shelter in the woods. Such insect destroying species as moles, shrews, toads and reptiles would become extinct with the destruction of the forests. Wide ranges of forests stabilize climatic conditions and make the production of vegetation and vegetable crops more uniform and certain. The camp at Davenport at the conclusion of its work had 1,500,000 new trees to its credit. Since these trees were planted 1000 to the acre, the total acreage covered was in the neighborhood of 1,500. In respect to the character of the trees planted, it may be said that transplants suited to the soil were used. These transplants were White Pine, Red Pine, Scotch Pine, Norway Spruce, Balsam and European Larch. In addition to the fact that these conifer species were adapted to the soil, there is another reason why coniferous trees are largely used in State reforestation work. It is the fact that the conifers are being crowded out by the hardwoods, for the hardwoods seed in more easily and have a higher germinating percentage of seeds than do the conifers.

Other than the lines of forestry activities already mentioned was the construction of four miles of telephone lines, the construction of bases for two fire towers and the transportation of structural steel to the sites of the towers. This work was interrupted by the early snows. Brush was cut out along numerous public highways in the township. Three miles of new roads were laid to Rock Rift Tower and other roads were repaired and bridges strengthened.

Shortly after the transfer was made to Deposit and the winter quarters were made livable, training work in the control of the Gypsy Moth pest began. This work is deemd particularly important in this area since heavy infestations of the moth are being combatted just over the State line in Pennsylvania. It has been and is now the policy of the New York State Forest Pest Control Bureau to control the spread of Gypsy Moth rather than be compelled to exterminate infestations which may spread owing to the absence of control. This is the most economic and efficient policy. To achieve this purpose, a barrier zone has been established along the Hudson River Valley and Champlain watershed to prevent encroachments of the moths from the New England States, where they have, in the past, done enormous damage to forest trees and fruit orchards. This work started in New York in 1923 and only

once since that time have Gypsy Moths been able to locate in an infestation across the Hudson River. The barrier zone now being established in this area by the Civilian Conservation Corps is similar to the Hudson River zone and its aim is to prevent the spread of the moths to this region of the State.

In view of the damage which the Gypsy Moths bring to nearly all species of trees, it may be timely to mention briefly a few of the life history characteristics of the pest. They were introduced from foreign sources about 1905. An attempt was being made to cross the Gypsy Moth with silk worms to increase the size of the latter. Cases containing specimens of the Gypsy Moth were broken up in a storm near Cape Cod and the pest was liberated. Since that time they have spread over most of the New England States and adjacent States, such as New Jersey and Pennsylvania. Damage by the moth occurs in the larva or caterpillar stage during which stage, in early Spring, the caterpillars feed on tree foliage. Successive attacks of these caterpillars over a number of years bring eventual death to the tree. The startling rate of reproduction of the moths is of interest. Each egg cluster laid by the female may contain from 300 to 800 eggs, each of which may in turn produce a member of this insect tribe. Egg masses when found are treated with creosote and left on the trees so as not to spread the eggs. It is during the winter months that these egg masses can be plainly located and killed. During the Spring of the year, trees are sprayed with a mixture of arsenate of lead and fish oil to kill any larva or caterpillars which may be about.

In conclusion, it may be said that the training and work of the Civilian Conservation Corps members in this phase of forestry activity has and now is proceeding satisfactorily. Many thousands of woodland acres will be scouted in this area. If infestations are found they will be exterminated. The importance of forests and forest products cannot be overestimated. The forests of this country have been used with waste and abandon and the Civilian Conservation Corps stands as a mighty force to recover to this country the strength of this great natural resource. The Corps stands further as a mighty force in preserving to a great many of our young men their self respect in these times of depression since it is not a dole from the Government but a real honest job they are doing for which they receive honest dollars.

The highly satisfactory results obtained by this company in its various assignments is due largely to the efficient cooperation in the work between the United States Army and the Forest Service. This cooperation is fully realized and appreciated by both.

* * *

Engineers and Civilization

(Continued from Page 7)

gains. Of course there have been net gains, even if incommensurate with the hopes and promise of science. Plainly we must hold those gains, and add to them rapidly and extensively; but I think we can do this only if the planning of the engineer and the scientist in their own fields gives rise to comparable planning in our social world.

So far as science and engineering themselves are concerned, I see no reason why the rate of expansion which characterized the "Century of Progress" should not be increased, at least for a time. While there are certain ultimate limitations in our supplies of coal, iron, petroleum, and soil fertility, it is obvous to most of us who are close to any partcular phase of scientific research or technical organization that there are imminent discoveries which, when applied, will increase per capita output enormously. Nearly every technical man knows in his heart that from a purely scientific, engineering point of view the most amazing things could be done within a relatively short period. Of course, in the world of hard fact the full effect of any revolutionary invention is not felt typically for 15 or 20 years. But I feel safe in saying that our scientists and inventors today have enough new stuff within their grasp or just around the corner so that the world 30 years hence could easily have a total productive power twice that of today.

It is almost equally possible that the total wealth-producing power of the world a generation hence will be less than it is today. The trouble, if it comes, will not be in the inability of scientists and technologists to understand and to exploit nature, but in the ability of man to understand man and to call out the best that is in him. In solving this limitation the scientists and engineers have all too often been a handicap rather than a help. They have turned loose upon the world new productive power without regard to the social implications. One hundred years ago the power looms of England destroyed the cottage weaving industry, and during the early years of that impact, misery strode over the countryside of England in proportion as the nouveaux riche gained capital to exploit their gains over the entire world. That kind of thing has been done again and again, and we have called it progress because the power of man over nature was increasing and because in the long run the common man shared in this increase. What happened to the common man in the short run, of course, could be of no concern to a laissez faire society.

Most of us, whether scientists, business men, or laborers, have until recently looked back on the Century of Progress and called it good, but today the afflictions of Job have descended upon us and we must of neccessity argue with Bildad, the Shuhite, and set ourselves right with our God before we go forward into a prosperity seven times that which we enjoyed before.

Acting perhaps in the capacity of Bildad, I would like to suggest that the very training which made possible the enormous material expansion of the past century may to some extent have made impossible the building of a just social system for the prompter and more uniform distribution of the wealth produced by the system. Most of the scientists and engineers were trained in laissez faire, classical economics, and in natural science based on the doctrine of the struggle for existence. They felt that competition was inherent in the very order of things, that "dog eat dog" was almost a divine command.

The power discovered by the scientists and inventors was applied in the United States by a race of men who had developed a concentrated individual will-power and an extraordinary thriftiness as a result of several generations of pioneer agricultural training and Protestant church-going. As a result, human power of high spiritual origin, but debased by the sophistication of the "devil take the hindmost" economics of the colleges, took command of the exploitation of the discoveries made by the scientists and inventors. The scientists and inventors have an intense kind of religion of their own—certain standards to which they like to be true—and as long as they could get enough money to pursue their researches, why should they care how someone else handled the social and economic power derived from these researches? Perhaps that is putting the matter unkindly, but other explanations that might be advanced are not much more flattering. Those who delved too deeply into social and economic problems got into trouble, and so many of the best scientists felt it was not good form to do things which to certain types of mentality seemed impractical and which might endanger science's financial support.

It is my observation that previous to 1933 more than three-fourths of the engineers and scientists believed implicitly in the orthodox economic and social point of view. Even today I suspect that more than half of the engineers and scientists feel that the good old days will soon be back when a respectable engineer or scientist can be an orthodox stand-patter without having the slightest qualm of conscience. It is so nice to feel that there are great supermen from whom, directly and indirectly, you draw your own sustenance, who, sitting Jove-like above us lesser mortals, make possible the free functioning of the law of supply and demand in such a way that their profits enlarge at the same rate that our research expands. Like most of you in this audience, I rather like that kind of a world, because I grew up in it; in some ways, I wish we could get back to it. But both my mind and my instinct tell me that it is impossible for any length of time. Of course, if prosperity returns within the next year or two, it is possible for us to think that we are back in that old world again. But unless the people who make profits and direct capital allocation to different productive enterprises have seen a great light, or unless we move forward into certain highly centralized forms of industrial and governmental control, we shall sink back into our former trouble.

There ought to be more than a little hope, it seems to me, in the fact that our engineers have demonstrated so successfully their skill in planning. In

many great industries, the engineers have been able to mark out the contours of expansion and development 10 to 15 years ahead. If in the past they seemed to be guided by purely material and mechanical considerations, that has doubtless been because such considerations were necessarily the chief ones so long as we were conquering a continent. Today it is becoming increasingly evident that we must take into account the qualitative as well as the quantitative expansive aspects. This would suggest that in the engineering courses of the future the engineers should be given an opportunity really to enrich their minds with imaginative, non-mathematical studies such as philosophy, literature, metaphysics, drama, and poetry. Of course so long as an engineer is burdened with the necessity of putting in 18 hours a day mastering calculus, mechanics, and the complex theories of electricity, he simply cannot give any effective attention to the cultural aspects of life. And if by accident an engineer, exposed to studies of this sort, should be enthused by them, he might for the time being become somewhat less effective as an engineer. We are thus exposed to a dilemma, which I would be tempted to solve by saying that probably no great harm would be done if a certain amount of technical efficiency in engineering were traded for a somewhat broader base in general culture.

It is difficult to see how the engineer and the scientist can much longer preserve a complete isolation from the economic and social world about them.; A world motivated by economic individualism has repeatedly come to the edge of the abyss, and this last time possibly came within a hair's breadth of plunging over. Yet science, all this time, has been creating another world and another civilization that simply must be motivated by some conscious social purpose, if civilization is to endure. Science and engineering will destroy themselves and the civilization of which they are a part unless there is built up a consciousness which is real and definite in meeting social problems as the engineer displays when he builds his bridge. The economist and the sociologist have not yet created this definite reality in their approach; can you, trained in engineering and science, help in giving this thought a definite body?

Today when the industrial nations of the world have skimmed most of the cream off the backward nations and the backward classes, and when there are no longer any challenging geographical frontiers to be conquered, it becomes apparent that we must learn to cooperate with each other instead of joining together in the exploitation of someone else. This means building a social machinery as precise and powerful as an automobile engine. How extraordinary is the patient vigor of thought which enables a group of engineers to blue-print and execute a new design! And how sloppy is our economic blue-printing and execution by comparison!

But it must be said in defense of the economists that their problem is infinitely more difficult than that of the engineer. The economic engineer has never had any excuse to exist until recently because no one gave him any orders for blue-prints. Even yet the objectives are so loosely defined, the popular will is in such a state of flux, that the designing of the economic engineer is about like that of an automotive engineer who discovers after he has completed his engine that it was to go into a tractor instead of an automobile.

As I have said to many farm audiences, we are children of the transition—we have left Egypt but we have not yet arrived at the Promised Land. We are learning to put off the hard-boiled language of the past, but we have not yet learned to speak the cooperative language of the future. One is as different from the other as a human being is different from an animal. There need be nothing impractical, there need be nothing foolishly idealistic about a Christian, cooperative, Democratic State. But I fear it will take us as long to build a public consciousness fitted to run such a state as it is taking the Russians to build efficient factories and train their people to run them.

We know that there must be a balance between productive power and consumptive power, and that excessive profits used to expand productive power beyond consumptive power are sure to lead to a breakdown. We know that the continued insistence on heavy exports in excess of imports by a creditor nation is bound to lead to disaster. We know today that the great unemployment is in the so-called heavy industries, and that this could be remedied if faith in a profound new excitement swept the country like the railroad-building boom of the early Eighties, or the automobile boom of the Twenties. This boom might take the form of totally new railroad equipment, or the popularization of new and better airplanes, or the making fashionable of winter homes and winter industries for everyone in the South and a duplicate summer set in the North. In any event, whatever is done to stimulate the heavy industries it is to be hoped that the bonds issued to pay for the stimulation will be on a long term, amortized, low-interest basis.

We know that we must have a monetary system which will bring about a better balance between debtor and creditor and between productive power and consumptive power. These things can be measured and social machines can be built to deal with them, but before success can be expected, there must run through the rank and file of the people a feeling that amounts to a profound determination to deal with social problems.

There is something about engineering which tends to lay emphasis on logical, cold, hard, lifeless facts. Nearly all engineers have suffered the common punishment resulting from the remorseless discipline of higher mathematics, physics, and mechanics. No man has to work as hard in college as the engineer. As a result, the engineer sometimes imputes a value to precise mathematical reasoning which it does not always have. There is such a thing as life, and the mathematics of life is as far beyond the calculus as the calculus is beyond arithmetic.

We can see in Mendelian genetics a complex algebra which has proved to be of some analytical use in determining the mechanism of heredity. Nevertheless, from the standpoint of producing superior plant and animal organisms, the engineering mathematical approach to life has not yet been especially successful. It seems to me that the emphasis of both engineering and science in the future must be shifted more and more toward the sympathetic understanding of the complexities of life, as contrasted with the simple, mathematical, mechanical understanding of material production.

The quantitative answers produced by the science of the past hundred years are not enough. They merely increase the speed of life without increasing the quality. Would that we had someone with the imagination of Sir Isaac Newton to develop the higher calculus of the engineering of life which is so necessary if our increased productive power is to increase total human happiness!

Haven't you sometimes wondered whether this whole Century of Progress might not be just a superficial and temporary phenomenon after all? The increase of physical output in three generations is so extraordinary that we've tended to think that this is what man is meant for. It seems to me a terribly inadequate yardstick of civilization. A man has food, clothing, and shelter; wherein does he differ from the beasts of the field? Surely these are not the things which distinguish the civilized from the uncivilized. Food and shelter and the other necessaries in any rational order ought to go without saying. They ought to be as automatic, and as universal, in this day of technological achievement, as the air we breathe. It is from this point on that life begins.

A characteristic of the engineer is his willingness to face the cold truth about the task to which he addresses himself. Engineers have brought to their jobs a more fully developed intellect than any other class of our citizenry. Sloppy, opportunistic thinking is simply inexcusable in the engineering world. I would be the last to suggest that the engineer abandon the precision of his thinking and his honesty in facing facts. I am merely asking that the same qualities be brought to bear insofar as possible on the more complex situations which have to do with living organisms and our social life. I fear, however, that in our social and economic life the objectives must always come from that mysterious realm which all engineers and scientists should treat with the greatest respect, but with which engineering and scientific methods are totally unable to grapple.

In brief, then, we wish a wider and better controlled use of engineering and science to the end that man may have a much higher percentage of his energy left over to enjoy the things which are non-material and non-economic, and I would include in this not only music, painting, literature, and sport for sport's sake, but I would particularly include the idle curiosity of the scientist himself. Even the most

enthusiastic engineers and scientists should be heartily desirous of bending their talents to serve these higher human ends. If the social will does not recognize these ends, at this particular stage in history, there is grave danger that Spengler may be proved right after all, and a thousand years hence a new civilization will be budding forth after this one has long laid fallow in a relative "Middle Ages."

* * *

Recovery Activities

(Continued from Page 8)

wider culture, or for improving associations and neighborliness, then the wisdom of the adoption of the shorter labor will have been amply demonstrated. It is to these ends that the engineers should bend every energy. It is to protect the welfare of our profession that we should at once awaken to the realization that we must now become a fighting unit.

* * *

Whither Engineering?

(Continued from Page 9)

the reflection that society needs a goodly supply of earnest, conscientious, industrious, painstaking followers who, after all, assume the burden of the world's work. These qualities, together with worthy ideals of character and conduct, we may properly expect educators to stress in all their contacts with students. We may also expect such an environment in college that the student will be imbued with a keen interest in knowledge and a continuing desire for its achievement.

Aside from preparation for a career, engineering education is the modern type of general liberal education, acquainting the learner, as it does, with the processes, devices, and methods which make our civilization distinctive. Cultured people are those who understand their environment — the world in which they live—and no type of education so directly assists the individual to understand his surroundings as engineering education, which familiarizes one with the machines and the techniques of the modern world. So we of the engineering profession as well as the public at large are interested in making engineering education more effective as a preparation for happy living. As Herbert Spencer stated, "To prepare us for complete living is the function which education has to discharge." This applies to engineering as well as to other types of education.

Some of the graduates of engineering colleges should be given encouragement to continue their preparation for engineering as a career, but a much larger number should be assisted in entering non-engineering vocations with engineering education and possibly even with some engineering practise as a foundation. There is a definite need for clear-thinking and fact-finding technique in professional, economic, business, and political fields.

A. S. M. E. Stand on Present-Day Problems

Present conditions make new demands upon a professional group. Our own society must assume leadership in the field of mechanical engineering, taking a definite stand in connection with the problems which are confronting our country and our profession. To be specific:

(*a*) The American Society of Mechanical Engineers must discourage the present movement to replace machine processes by hand labor. During recent months an effort has been made to decry capital expenditures, to urge the substitution of human and animal labor for mechanical power and machinery, and to hinder economical methods of production. The present will not be improved and the future will be greatly impoverished if this type of thinking prevails. Surley, we cannot have too many or too effective devices for relieving men from drudgery or for supplying human beings with more comforts. It may be recalled that during the years of greatest prosperity millions of people, even in this most favored land, lacked many of the material comforts which are essential for well-being and happiness. We are far from the saturation point in our need to utilize science and engineering.

(*b*) Our society must take the lead in the stabilization of the so-called durable-goods or capital-goods industries. In 1928 more than half of the industrial workers of the country were engaged in these industries, which comprise tool making, machine making, power production, equipment manufacture, construction, and the development of the heavy industries such as iron and steel, coal, copper, and oil. Activity in these industries is absolutely essential to insure the welfare of a highly industrialized land such as ours. At the same time, however, care must be taken not to have industry over-tooled for the production of the market demand for consumers' goods, and it is clearly within the province of a Society such as ours to aid in the preparation and dissemination of accurate statistics regarding production capacity and consumer demand.

(*c*) The American Society of Mechanical Engineers must lead in a policy of rational distribution of the leisure dividends of quantity production. To this end it should encourage investigations of the shorter work week, not only for the manual workers but for the clerical, engineering, and executive staffs as well. Perhaps consumer demand may be fully satisfied with fewer man-hours of work and the resulting leisure more equitably divided than is now the case. Also we should cooperate individually and through our sections with the adult-education programs in the different parts of our land and should definitely become exponents of cultural advance.

(*d*) Our Society should give even greater attention than it does now, in its publications and in its meetings, both national and local, to discussions and papers which are definitely concerned with the scientific, technological, social, and economic problems of the present industrial age. Among the most important of these are the art of industrial management, correlation of agriculture and industry, re-estimating fundamental social values, and aesthetic objectives in engineering design. The engineering society must be constantly contributing to public welfare and must be working to widen the horizon and to enlarge the usefulness of the engineer, so that he may be better prepared to render broad and effective service.

(*e*) The American Society of Mechanical Engineers must keep in close touch with science, as the great engineering achievements of the future will definitely depend upon more scientific knowledge. It must aid in scientific research, in the development of rational designs, in national and international standardization, and in the perfection of labor-liberating machinery to ease the burdens of every day living.

Unifying the Engineering Profession

Said Sir Francis Bacon more than 300 years ago: "I hold every man a debtor to his profession; from which, as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereto." Can we today better define the relation of the individual to his profession? Can we as a society hold to a higher objective than the fostering of this attitude?

It is gratifying that our own society has always reviewed its own accomplishments with a critical eye and has promptly moved forward in the line of progress. Among the recent advances may be mentioned its leadership in coordinating the joint activities of the engineering profession, its interests in human and economic problems, evidenced by the Society publications, its activity in the stimulation of the capital-goods industries and its initiative in organizing the Engineers' Council for Professional Development.

The engineering profession must be unified in its viewpoint, thought, and action. Engineers must assume professional status individually and collectively. An individual becomes a professional man when he regards himself as a public servant first and as a private practitioner second. A society like The American Society of Mechanical Engineers becomes a professional body when, and only when, the conscious object of public service underlies all of its actions. Codes of professional conduct and concerted action in matters of general interest will help to focus the attention of the members of a professional group upon the public aspects of their calling; perhaps the individualistic attitude of some persons may even be changed by the effective public opinion of their peers, thus unifying the engineering profession in its efforts to the public weal.

Until recently the engineer has been an individualist who surveyed, designed, constructed, tested, and operated public works, machines, and tools, and gave little attention to the wider significance of his work or to his social responsibilities. He has worked within the confines of his own field and has had no sense of professional responsibility; neither has he appreciated the strength potential in cooperation among engineers. He has

usually joined a professional society when it appeared that his immediate interest would be served, and this in turn has compelled the engineering societies to devote first attention to serving the member's immediate needs, that is, to provide for his technological advance. Gradually this attitude has changed—has given way to the larger conception of an engineering profession; and it only remains for us to consolidate the gains, realizing in formal unified organization the progress already achieved, and to prepare for a rapid further advance.

The work of the engineer is not of recent origin; his contributions date back to the earlier periods of human history, and antedate some callings which have long enjoyed professional standing. Members of the professions of religion, law, and medicine received public recognition when among themselves they realized the public character of their work and developed principles of action or codes of ethics. Engineers must think, act, and appear as a unified and well-coordinated group; a well-knit and well-integrated solid body, not as a collection of individuals, each going his separate way; nor can the profession be properly represented by several distinct societies going their separate ways. This is the time for definite action to perfect the unity and solidarity of our profession, and I am glad that the Founder Engineering Societies are now working on this important problem. We may expect that their efforts will result in some form of central agency, competent to deal with the joint activities of all engineering societies and to pass upon questions of general import without, however, interfering with the technical fields or with the autonomy of the various engineering groups. Engineers have been credited with outstanding success in organizing industrial projects of great magnitude; let us now utilize some of the ability displayed in this work to unify and cordinate our professional advance.

Unifying the engineering profession will enable us to work more effectively on public questions of truly national scope. A central national agency should soon be supplemented by regional or state joint committees to assist governmental authorities in the solution of economic, social, political, and other policy-planning programs. Such groups, composed of engineers, informed and alert, can do the things needful to help governmental agencies in dealing with public questions and particularly with those which have technological aspects.

Whither Engineering?

Whither Engineering? Inevitably toward public service—toward the ideal that the engineer is a public official, charged first with a public function, as a lawyer is an officer of the court, responsible for its dignity and honor. Inevitably toward a wider responsibility—toward the ideal that he is responsible for maintaining that balance in the social structure which modern conditions have sometimes so violently upset. Inevitably toward active participation in political affairs where clear thinking and courageous action are badly needed. Inevitably toward a higher type of education—toward the ideal that men shall appreciate their time and understand its trend. Inevitably toward a more closely knit professional organization and a more pronounced professional consciousness—toward the ideal that the wider duties and greater responsibilities of our calling may be met promptly and effectively.

* * *

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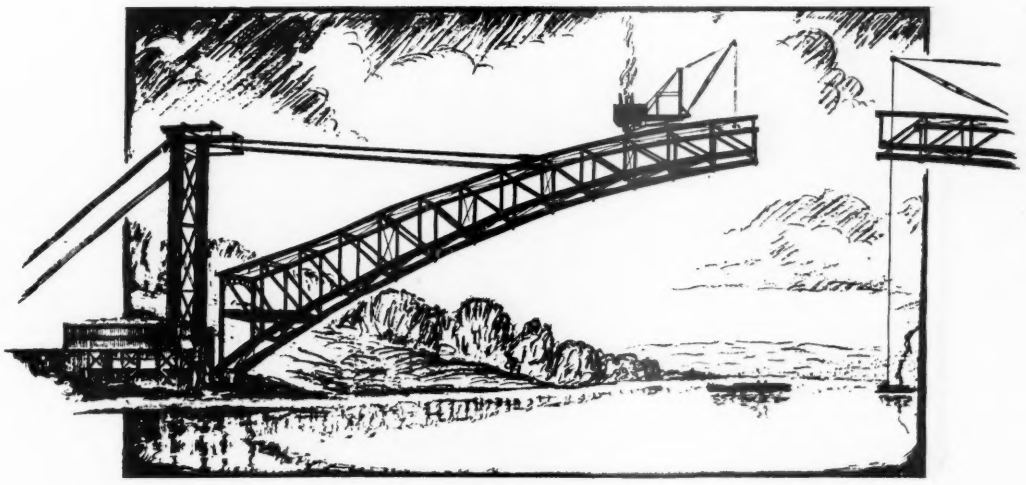

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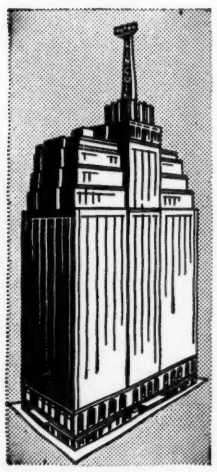

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